BULLETIN

OF THE

AMERICAN GEOGRAPHICAL SOCIETY

Vol. XLV 1913 No. 4

THE PANAMA CANAL: ITS CONSTRUCTION AND ITS EFFECT ON COMMERCE

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Stimulated by what he saw on a recent visit to the Panama Canal the writer's desire was aroused for more information than can be derived from a short visit. The following pages are the result of his inquiries. Although making no pretense to scientific treatment they are offered in the hope that they may nevertheless prove of interest.

Our party sailed from New York early in October, 1912, on the Atlas Line steamer *Prinz August Wilhelm* for Colon. Our first stop was at Fortune Island in the Bahamas. Here we took on board forty husky negroes as stevedores to unload the ship's cargo in Colon and to reload her for her return trip. This procedure has become necessary in the West Indian and Central American trade since the construction of the canal began, as it has been found impossible to secure adequate help for this purpose at the different Central American ports.

After a day's stop at Kingston, Jamaica, we resumed our voyage, arriving at Colon on October 14. The harbor of Colon is open and exposed to easterly winds and in time of storm affords but little protection to vessels. The Government of the United States, as a part of the comprehensive scheme for building the canal, is erecting a break-water extending from the north shore two and a half miles to deep water, which, it is believed, will make a safe haven for all the ships of the world that may at any time congregate there.

History of the Isthmus. As we started on the journey across

the Isthmus, I could not but recall the intensely interesting history of the country—the discovery by Columbus, his unsuccessful efforts to find a maritime channel between the two oceans, the hardships endured by that intrepid explorer, Vasco Nuñez de Balboa, who crossed the Isthmus of Darien, later called Panama, through almost impenetrable jungles and impossible swamps, whose perseverance was rewarded when, on September 25, 1513, reaching the continental divide, he saw in the distance the wide Pacific Ocean; how the stories of rich gold and silver mines to the south of the Isthmus excited the cupidity of the adventurous buccaneer, and led to the settlement of the Latin-American states by the Spaniards of four centuries ago; the repeated attempts that were made to find a strait through the continent; the building of old Panama; its grandeur and glory, its reputation for riches, which resulted in the raid of Morgan and the complete effacement of its fifteen thousand buildings. I recalled the ill-fated Darien expedition, which destroyed the hopes of the English to extend their posts to the Pacific, at the close of the seventeenth century; the hostility of the Indians to the Spaniards; the passage of the act by the Cortes of Spain, in 1814, authorizing the construction of a canal through the Isthmus and providing for the formation of a company to effect the enterprise; how, before anything was accomplished under this legislation, the restless spirit of the Latin-Americans resulted in revolution, and all the Central and South American republics were created and that rich land lost forever to Spain. With the passing of that once great world power went its cherished hope of uniting the two oceans. And then I thought of the thrilling history of these new Spanish republics; how in 1819 Simon Bolivar succeeded in having the states of New Granada, Ecuador and Venezuela join in the Confederation of Colombia, only to disrupt again in 1831, when the Isthmus of Panama became a part of New Granada; how this republic in 1838 granted to a French company the right to construct highways, railroads and canals from Panama to the Atlantic Ocean; the careful work, surveys, soundings that were made by this French company, creating optimism in the success of the venture, only to be followed eight years later by discouragements, government opposition, and defeat; how the discovery of gold in California led to such a tide of emigration from the north and east by way of the Isthmus as to demand improved methods of transportation across that narrow strip of land, resulting in the concession in 1849 by New Granada to William Henry Aspinwall, John L. Boyd Stephens and Henry Chauncey, of New York, and their associates, of the privilege of

building the Panama Railroad, and the difficulties that were encountered in its construction and operation.

Shortly after the discovery of America and following the conception of its geography, the building of a canal to unite the Atlantic and Pacific was the dream and hope of Spain, Great Britain, France and the United States, each in turn. Concessions for the purpose were, again and again, made by the republics of New Granada, Colombia and Nicaragua. President Grant's first message to Congress recommended an American canal. A joint resolution was passed authorizing surveys and exploration by the Navy Department. Both the Nicaragua and Panama routes were carefully surveyed, and the Canal Commission, which had been created in 1872, reported in favor of the Nicaragua route in 1876. In the meantime, France had sent a representative to the Isthmus of Panama to make a survey of that route, and found it feasible to obtain a concession from the Republic of Colombia. Although only a partial and hurried survey was made, the scheme was reported as practicable. The glowing report of the engineers as to the cost of construction and the immense profits to be made, together with the glory of accomplishing the work, appealed to the pride of the French nation, and on the formation of the Panama Canal Company, with the noted De Lesseps at its head, a stream of gold came pouring into the coffers of the company from every nook and corner of France. Never had so important a work been undertaken with so little care and preparation. Millions were wasted owing to inadequate surveys, and countless lives were destroyed by ignoring the ordinary laws of sanitation. Plans were changed, channels diverted, excavations abandoned, fills made and deserted. The incomplete and unreliable data, on which De Lesseps acted, ignoring the reports of competent engineers, made the failure of the work inevitable. After $260,000,000 had been spent by the French company, failure was acknowledged and a receiver was appointed. It was at this juncture that the United States came to the rescue and undertook the completion of the canal. It offered the Panama Canal Company for all its rights, concessions, machinery, material, plans and surveys, including its holdings of the stock of the Panama Railroad Company, the sum of $40,000,000, that being the amount that the Canal Commission reported to be its value to the United States. The French company demanded $109,000,000, and it was not till after our Government had taken up again the consideration of the Nicaragua route and obtained a concession for it from that republic that the French stockholders determined to accept our offer.

The Spooner Bill, providing for the purchase of the canal from the French company, also authorized the making of a treaty with the Republic of Colombia, by which our Government should secure the perpetual title to and control over the canal zone. The amount to be paid to the Colombian Republic was not to exceed $10,000,000. During the pendency of negotiations with the Republic of Colombia, and while our offer of $10,000,000 was under consideration by that government, its Congress adjourned for a year without taking any action. Almost immediately thereafter and opportunely for the possible consummation of the scheme by the United States, the Panama revolution occurred. On its apparent success the United States recognized the new republic, negotiated the Hay-Bunau-Varilla Treaty, in the closing months of 1903, which was ratified February, 1904. This treaty provides among other things, as follows:

Independence of the Republic of Panama. Article I. The United States guarantees and will maintain the independence of the Republic of Panama.

Perpetual Grant of the Canal Zone. Article II. The Republic of Panama grants to the United States in perpetuity the use, occupation and control of a zone of land, and land under water, for the construction, maintenance, operation, sanitation and protection of said canal, of the width of ten miles, extending to the distance of five miles on each side of the center line of the canal to be constructed; the said zone beginning in the Caribbean Sea, three marine miles from mean low-water mark, and extending to and across the Isthmus of Panama into the Pacific Ocean, to a distance of three marine miles from mean low-water mark, with the proviso that the cities of Panama and Colon and the harbors adjacent to said cities, which are included within the boundaries of the zone above described, shall not be included within this grant.

The Republic of Panama further grants in like manner to the United States all islands within the limits of the zone above described, and, in addition thereto, the group of small islands in the Bay of Panama, named Perico, Naos, Culebra and Flamenco.

Article III confers the sovereign rights, power and authority of the United States to all the territory named in Article II.

Article VII. The Republic of Panama agrees that the cities of Panama and Colon shall comply in perpetuity with the sanitary ordinances prescribed by the United States, and on failure thereof the United States has the right and authority to enforce the same.

The same right and authority are granted to the United States for maintenance of public order in the cities of Panama and Colon and the territories and harbors adjacent thereto in case the Republic of Panama should not be, in the judgment of the United States, able to maintain such order.

Article IX. The United States agrees that the ports at either entrance of the canal and the waters thereof, and the Republic of Panama agrees that the towns of Panama and Colon, shall be free for all time so that there shall be imposed or collected custom-house tolls, tonnage, anchorage, light-house, wharf, pilot or quarantine dues, or any other charges or taxes of any kind upon

View of Culebra Cut from top of Contractors Hill looking toward Colon.

Culebra Cut looking north from south of Gold Hill.

any vessel using, or passing through the canal, or belonging to, or employed by the United States, directly or indirectly, in connection with the construction, maintenance, operation of the canal, except such tolls and charges as may be imposed by the United States for the use of the canal and other works, and except tolls and charges imposed by the Republic of Panama upon merchandise destined to be introduced for the consumption of the rest of the Republic of Panama and upon vessels touching at the ports of Panama and Colon, and which do not cross the canal.

Article XIV. As the price of compensation for the rights, powers and privileges granted in this convention by the Republic of Panama to the United States, the Government of the United States agrees to pay to the Republic of Panama the sum of $10,000,000 in gold coin of the United States on the exchange of the ratification of this convention, and also an annual payment, during the life of this convention, of two hundred and fifty thousand dollars ($250,000) in like gold coin, beginning nine years after the date aforesaid.

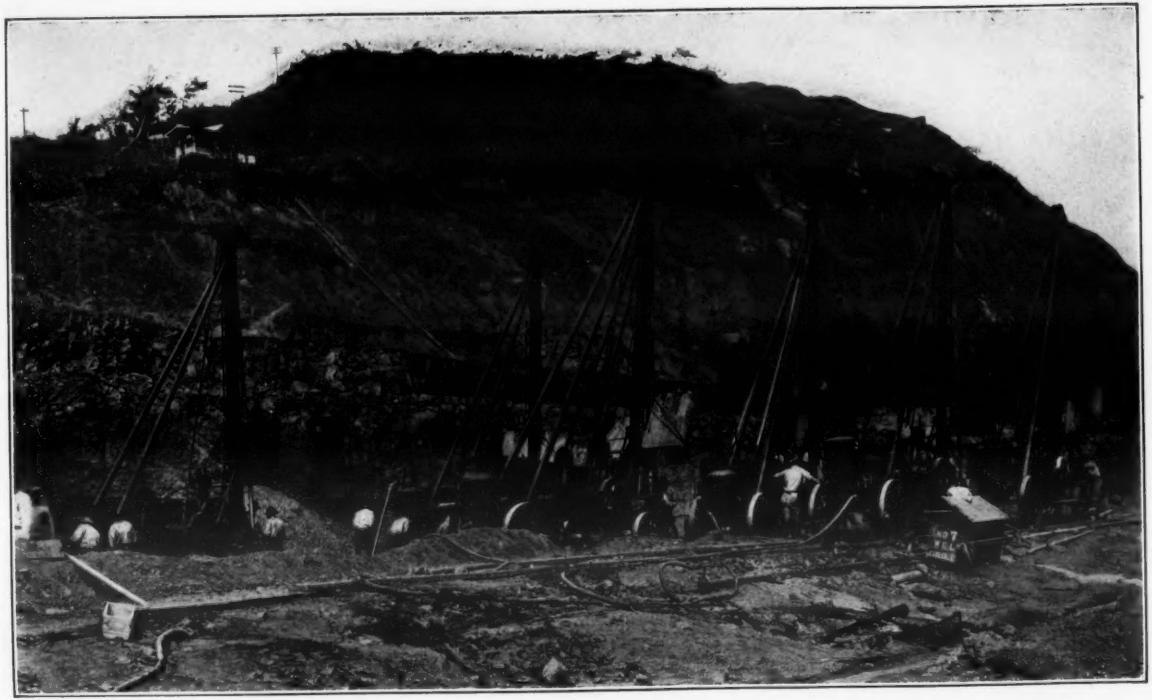
Article XVIII. The canal, when constructed, and the entrances thereto, shall be neutral in perpetuity, and shall be open upon the terms provided for by Section I of Article III, of and in conformity with all of the stipulations of the treaty entered into by the Governments of the United States and Great Britain on November 18, 1901. [This refers to the Hay-Pauncefote Treaty, "designed to facilitate the construction of the Panama Canal."]

Under the Spooner Bill President Roosevelt appointed a commission of seven members to prosecute the canal work, and on March 9, 1904, directed the Honorable William H. Taft, Secretary of War, to assume supervision of the work of the Isthmian Canal Commission. Several changes have been made in the management of the work. It is now under the full direction and superintendence of a military board of officers from the regular army, the chief being that exceptionally able engineer and man of remarkable executive ability, Col. George W. Goethals, Corps of Engineers, U. S A. He is assisted by an excellent organization. All of the officers engaged in the work have shown marked ability, untiring devotion and zealous interest in the work, and in nearly every case at great personal loss and discomfort. The rapidity and perfection of their work in all of its phases have astonished and excited the admiration of the world. Scepticism as to the success of the undertaking, one of the greatest engineering feats of the world, has given way to unquestioned confidence in its full and perfect completion.

Description of the Canal (cf. map on p. 247). The Canal Zone, as has been stated, is a strip of land ten miles wide, extending from the Atlantic to the Pacific. It contains 448 square miles. The canal traverses this zone from Colon to Panama, in a southeasterly direction. It is not generally known that Panama is 22 miles east of a line drawn due south from Colon. The entire length of the canal is 50 miles, of which 10 miles is outside of the shore lines.

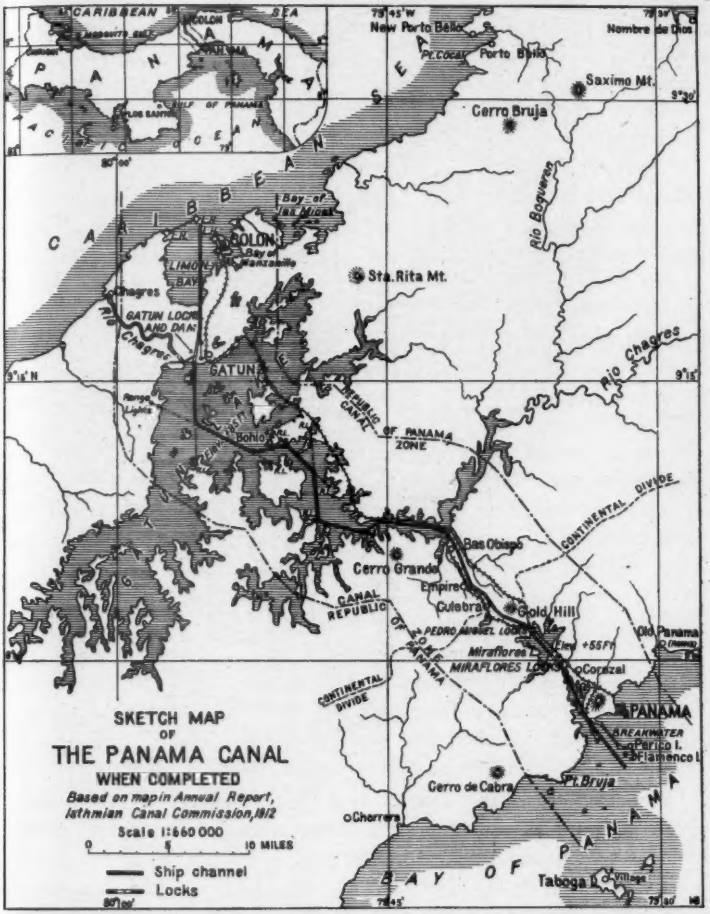
In passing through the canal from the Atlantic, vessels will enter the channel in the harbor at Colon and proceed to the locks at Gatun. This channel is 7 miles long, 500 feet wide and 41 feet deep. At Gatun there are three twin locks in flight, in which vessels are lifted 85 feet from the sea level, passing into the waters of Gatun Lake. This lake has an area of 164 square miles, is artificial, and has been formed by damming the Chagres River and its tributaries. The dam is at the side of the Gatun Locks, where a break in the range of hills existed which surround the basin of the Chagres. It is a mile and a half long across the gap, and 2,100 feet, or about half a mile, thick at the base, 400 feet thick at the water line, and 100 feet wide at the crest. The top of the dam is 105 feet above sea level, and 20 feet above the surface of the water of the lake. There is a spillway located about midway of the dam, built into a natural hill which stood at an elevation of 110 feet above sea level. This hill was solid rock, so a channel 300 feet wide was cut through it and lined with concrete and a dam built across the head of this channel to form the spillway, or regulating works, for Gatun Lake. Gates are placed on the top of the dam to control the level of the lake. Water can be discharged from the lake, either over the top of these gates at an elevation of 87 feet, the height of the crest of the gates when closed, or, by raising the gates, the water can be discharged under them and over the concrete portion of the dam, at an elevation of 69 feet. At the end of each rainy season, the gates will be closed and the lake level increased from 85 to 87 feet. When the rainy season begins the gates will be raised, allowing the water to escape below them, at an elevation of 69 feet, thus completely controlling the flow of the Chagres River.

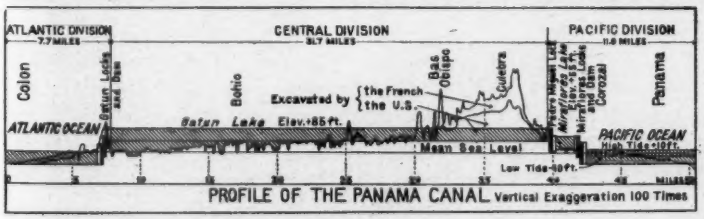
The surface of Gatun Lake stands 85 feet above sea level, the summit level of the canal, and extends from Gatun through the Culebra Cut to the southern end at Pedro Miguel, a distance of 32 miles. The surface of the water throughout this artificial lake will be the same, but the depth will vary. The great cut at Culebra, making a part of the lake, is made at just sufficient depth to enable vessels of the largest tonnage to pass in safety. A vessel may steam at full speed through this lake in a channel varying from 500 feet to 1,000 feet in width, the depth varying from 45 to 85 feet, for a distance of 24 miles, from Gatun to Bas Obispo, where it will enter the Culebra Cut. It will pass through the cut at a reduced rate of speed, a distance of nine miles, in a channel with a bottom width of 300 feet, to Pedro Miguel Lock, at the south end of the lake, through which vessels are lowered in one step from the 85 feet above sea



Churn or well drills working in Culebra Cut opposite Contractors Hill.

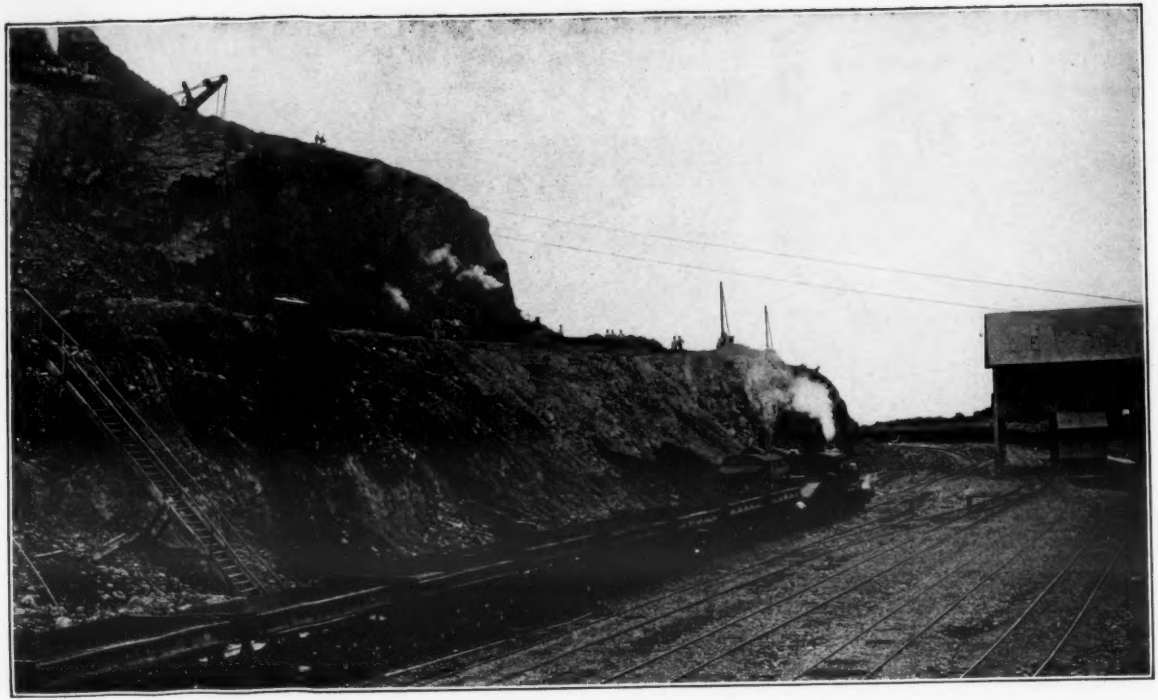
Culebra Cut, showing a section of the large slide, February, 1913.


CARIBBEAN SEA
COLON
New Porto Bello
Pt. Cocal
Porto Bello
Nombre de Dios
Saximo Mt.
Cerro Bruja
Rio Boguerao
Bay of Las Minas
COLON
Bay of Manzanillo
LIMON BAY
Chagres
Sta. Rita Mt.
GATUN LOCKS AND DAM
Rio Chagres
GATUN
Range Lights
Bohio
PANAMA CANAL
ZONE
CONTINENTAL DIVIDE
Bas Obispo
Cerro Grande
Empire
Culebra
Gold Hill
CANAL
REPUBLIC OF PANAMA
PEDRO MIGUEL LOCKS
Miraflores L.
Elev. +55 Ft.
MIRAFLORES LOCK
Corozal
Old Panama
PANAMA
BREAKWATER
Perico I.
Flamenco I.
Pt. Bruja
Gerro de Cabra
Cherrera
BAY OF PANAMA
Taboga I.
Village
SKETCH MAP
OF
THE PANAMA CANAL
WHEN COMPLETED
Based on map in Annual Report, Isthmian Canal Commission, 1912
Scale 1:660 000
0 5 10 MILES
Ship channel
Locks


ATLANTIC DIVISION
7.7 MILES
CENTRAL DIVISION
31.7 MILES
PACIFIC DIVISION
11.6 MILES
Colon
Gatun Locks and Dam
Bohio
Excavated by the French / the U.S.
Bas Obispo
Culebra
Pedro Miguel Lock
Miraflores Lake
Miraflores Locks and Dam
Corozal
Panama
ATLANTIC OCEAN
Gatun Lake Elev. +85 Ft.
PACIFIC OCEAN
High Tide +10 Ft.
Mean Sea Level
Low Tide -10 Ft.
MILES
PROFILE OF THE PANAMA CANAL Vertical Exaggeration 100 Times

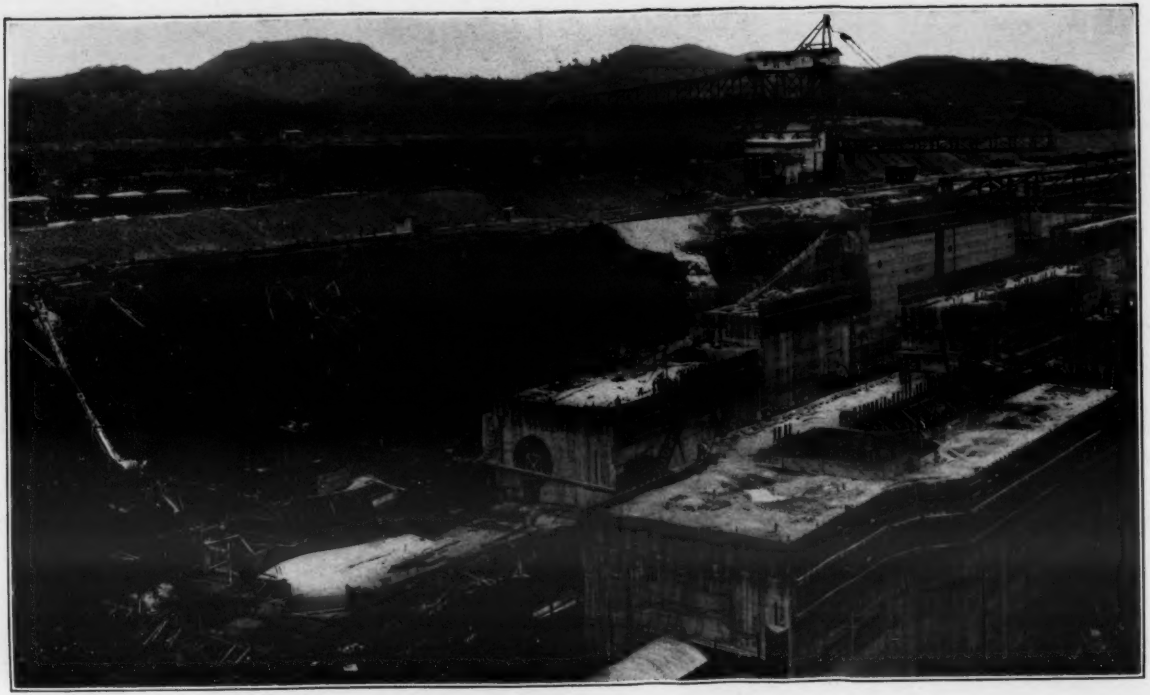
level to 55 feet above, a drop of 30 feet, passing out into Miraflores Lake, a small artificial lake covering an area of about two square miles. This lake is formed by impounding the water of the Cocoli, the Rio Grande and the Pedro Miguel Rivers by means of the dam, locks and spillway at Miraflores. The dam at this point runs parallel to the locks, instead of at right angles to them. This is done for the purpose of taking in the Cocoli River. Passing through Miraflores Lake, a distance of a mile and a half, through a channel 500 feet in width at the base, vessels arrive at Miraflores Locks and pass down through two locks in flight from 55 feet above sea level to the sea level channel on the Pacific side, and thence under full speed to deep water in the Pacific, eight miles distant. The time for passing through from one ocean to the other will be from ten to twelve hours, according to the speed and draft of the vessel. Three hours of this time will be taken up in passing through the six locks. All vessels are required to go through the locks in tow of electric locomotives running on tracks with center cog rails. There are two locomotives in front, one on each side to tow, and two in the rear to retard. Should a vessel come within what is regarded as the danger line to the gates of the lock, it would encounter a chain stretched across the entrance to the lock chamber. This chain is held in place by powerful hydraulic cylinders, located inside of the lock walls. The pressure from these cylinders causes the chain as it plays out to offer more and more resistance to the motion of the vessel. It is said to be capable of stopping within 70 feet a ten-thousand-ton vessel running four miles an hour. After the electric locomotives are attached this protective chain drops into a groove, permitting the boat to pass safely over it.

Construction of the Canal. One can have only a very imperfect conception of the magnitude of the work involved in the building of the Panama Canal without going over the ground and witnessing its operation. The largest cut is at Culebra, a distance of nine miles, through igneous rock deposited in loose beds of clay and soft sandstones. This peculiar formation causes the slides which have proven so troublesome and expensive. The average depth to which it was necessary to excavate below the natural surface was 120 feet, through the entire length of the cut. The width of the bottom is 300 feet, widening as the slopes extend upward. At the level where the continental divide was made, between Gold Hill and Contractors Hill, the excavation runs 375 feet in depth, the slopes being in places over 600 feet. The photographs facing pages 244, 245 and 247 will give the reader a slight idea of the length and

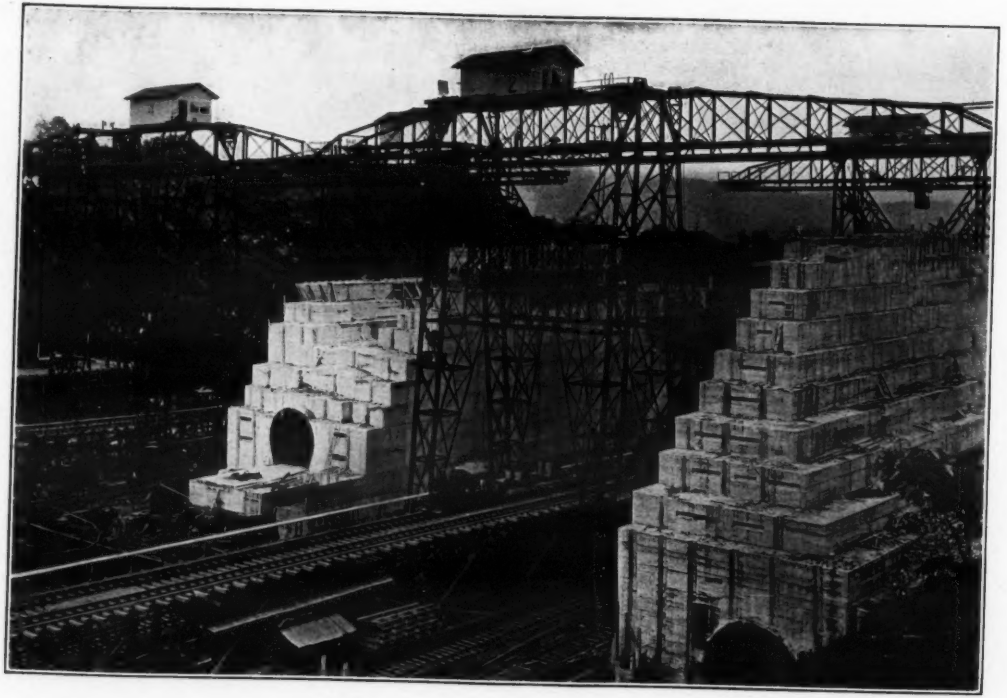


Ancon quarry, showing levels.

View of Miraflores, showing a monitor at work.



Showing center and west walls, lower locks, Miraflores.



View showing all the chamber cranes in Pedro Miguel locks.

breadth of this great cut. The estimated total excavation was 185,000,000 cubic yards, of which 172,000,000 cubic yards had been removed by September 1, 1912. From time to time slides into the Culebra Cut have added to the material to be excavated. There are in all twenty-one slides along the Culebra Cut. Twelve cover areas varying from one to forty-seven acres, and nine cover areas less than one acre each, making in all an area of one hundred and forty-nine acres. We have space for description of only the largest slide known as the Cucaracha slide, on the east side of the canal. It covers an area of forty-seven acres and has broken back 1,820 feet from the center line of the canal. This slide, according to the French records, began in 1884, and has been the source of considerable trouble to the Government forces. Over 2,000,000 cubic yards have been added to the excavation by this slide since the work was undertaken by the United States, and it is still active. Before the recent slide took place it was estimated that less than ten million cubic yards remained to be excavated. In the year 1911, 16,600,000 cubic yards were excavated, so that there now remains less material to be taken out than was removed last year. Forty steam shovels are at work excavating this material, each one taking out an average of 1,500 cubic yards per day. As a matter of fact, the steam shovels can work only six hours a day, as the transportation facilities will not admit of unloading the cars any faster. There are seventy-five miles of track in the cut, of which it is necessary to move about a mile each day. I was told that 150 was the average number of loaded trains of earth that passed out of the cut each day, or about one every three minutes. The monthly output from the cut alone reaches close to 1,500,000 cubic yards.

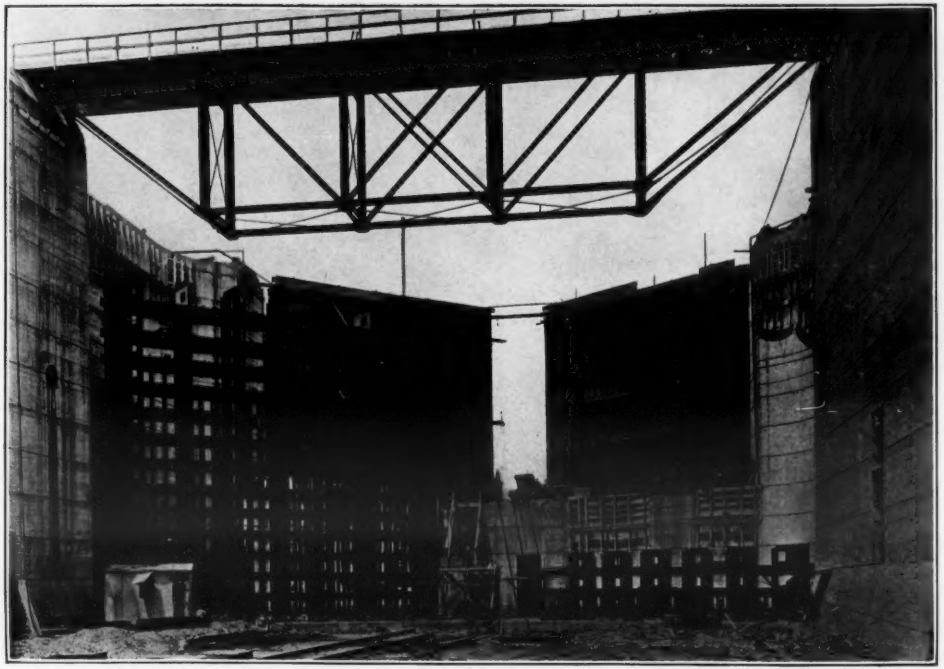
It may be interesting to know that the buckets used on the steam shovels load four to five cubic yards at a time, each shovelful weighing from six to seven tons, and four shovelfuls filling a car. All of the material which is excavated in the cut, excepting the slides, is first drilled and then blasted, before it can be handled, and drills are kept constantly at work, as shown in the picture facing page 246. These drills are operated by compressed air from one long main paralleling the cut. Three compressor plants do the work. The average depth to which the holes are drilled is 24 feet, and after drilling to this depth a small charge of dynamite is placed in the hole and discharged by a magneto battery. This enlarges the bottom of the drilled hole. After the hole has cooled, it receives the large charge of dynamite, varying from 75 to 200 pounds to each hole. This charge for effectiveness is exploded by

means of the regular electric light current, the other having been found unreliable. Each month an average of seventy-five miles of drilled holes are sunk. It is stated that "if all the drill holes which have been put down since the United States has been at work were placed end to end the hole would pass entirely through the earth, coming out in the Indian Ocean south of the Island of Sumatra." There are over 800,000 pounds of dynamite used each month on the canal.

It would be impossible to unload the construction cars in the ordinary way. The work has been facilitated very much by the use of plows, operated by a cable upon a winding drum. The average load of a train of flat-cars, in hauling the mixed material known as "the run of the cut," is 610.7 tons (based on a 20-car train), of a train of large dump cars, 737.68 tons. The average time consumed in unloading a train of flat cars is from 7 to 15 minutes. The dump cars take longer, ranging from 15 minutes, if by compressed air of the locomotives, to 56 minutes, when done by hand. I counted as many as thirty trains loaded waiting their turn to unload at the Balboa terminal. In order to bring the immense amount of earth which will have been excavated at the completion of the work within one's comprehension, it may be well to make another comparison. If the material taken out by the United States, and also the 30,000,000 cubic yards of useful French excavation were loaded on one train of flat cars, similar to those used on the work, it would make a train 96,000 miles long, reaching practically four times around the earth.

The canal force consists of the "gold" force, made up of officials, clerical help, construction men and skilled artisans, 5,347 in number, and the "silver" force, representing the unskilled laborers, to the number of 35,232, a total of 40,579. There are in operation at the canal 100 steam shovels, 158 American locomotives, 112 French locomotives, 13 narrow gauge American locomotives, and 12 electric locomotives, making a total of 315 locomotives. There are 560 drills and 4,346 cars.

It will be seen that in prosecuting the present work provision must be made for an army of employees. The Quartermaster's Department consists of two branches, "Labor and Quarters" and "Material and Supplies." It houses and feeds this army of 40,000 men. The material and supply branch carries in eight general storehouses a stock of supplies valued at between four million and five million dollars. About $12,000,000 worth of supplies are purchased annually, requiring the discharge of one steamer each day.



Erecting upper guard gates and upper lock gates, west chamber, Pedro Miguel.

Discharge at Gatun spillway.

The commissary system consists of 22 general stores in as many canal zone villages and camps. It is estimated that with the employees and their dependents there are 65,000 daily supplied with food, clothing and other necessaries.

The photographs on the preceding pages will give the reader an idea of the size, the length and breadth of the canal locks. There are six locks in the canal, three in flight at Gatun, one at Pedro Miguel, and two in flight at Miraflores. All locks are connected in pairs so that vessels can go in opposite directions at the same time. Each lock, or flight of locks, is reserved for ships going in one direction, the twin lock, or flight, being used for vessels going in the opposite direction. The length of the lock chamber is 1,000 feet, and the depth of the water over the sills is 41⅔ feet in fresh water and 40 feet in salt water, the difference being due to the greater buoyancy of the salt water.

There has been much controversy over the merits of the two different plans of constructing the canal. Many good engineers favored the sea level canal, among them nearly all the foreign engineers whose opinion was consulted when the United States took over the canal from the French Company. The American engineers, quite as eminent and largely in the majority, on the other hand, advocated the lock type of canal. The chief objection to the sea level canal was the enormous quantity of material that would have to be excavated and the tremendous cost of making a canal deep enough for vessels to pass through from ocean to ocean. It would mean an additional excavation of the entire length of the canal inside the locks, about forty miles, to a depth of 85 feet below the present level of the canal. While it is regarded as a possible engineering feat, the greater cost and longer time that would be required to do it precluded its adoption.

I find that an erroneous impression exists as to the level of the two oceans at the Isthmus, to the effect that the Pacific Ocean at that point stands at a higher level than the Atlantic, and that this presents an unsurmountable obstacle to building a sea level canal. As a matter of fact, the mean sea level of the two oceans at the Isthmus is exactly the same. By mean sea level is meant the point midway between extreme high and low tide. The difference is all in the tides. There is an average tide range on the Atlantic at the Isthmus of but 20 inches, while on the Pacific it is 20 feet. The high tide on the Pacific is due to the shape of the Bay of Panama, which, being shaped like a funnel, tends to exaggerate

the action of the tide. The same thing occurs in several other places, notably in Puget Sound and the Bay of Fundy.

Effect on Commerce. No American can contemplate this magnificent work without a feeling of intense pride in his country and the men who are building this great monument to the glory of the nation. No public utility has ever been built that compares with it either in the magnitude of the work or in the extent of its effect on the commerce of the world. Its immediate effect will be to extend the coast line of the United States to the Isthmus of Panama. President Hayes, in 1879, stated that "An inter-oceanic canal across the American Isthmus will essentially change the geographic relations between the Atlantic and Pacific coasts of the United States and between the United States and the rest of the world." One has but to glance at the map of the American hemisphere to be impressed with the wonderful economies of time and distance that will be accomplished by this new passage between the oceans of the world.

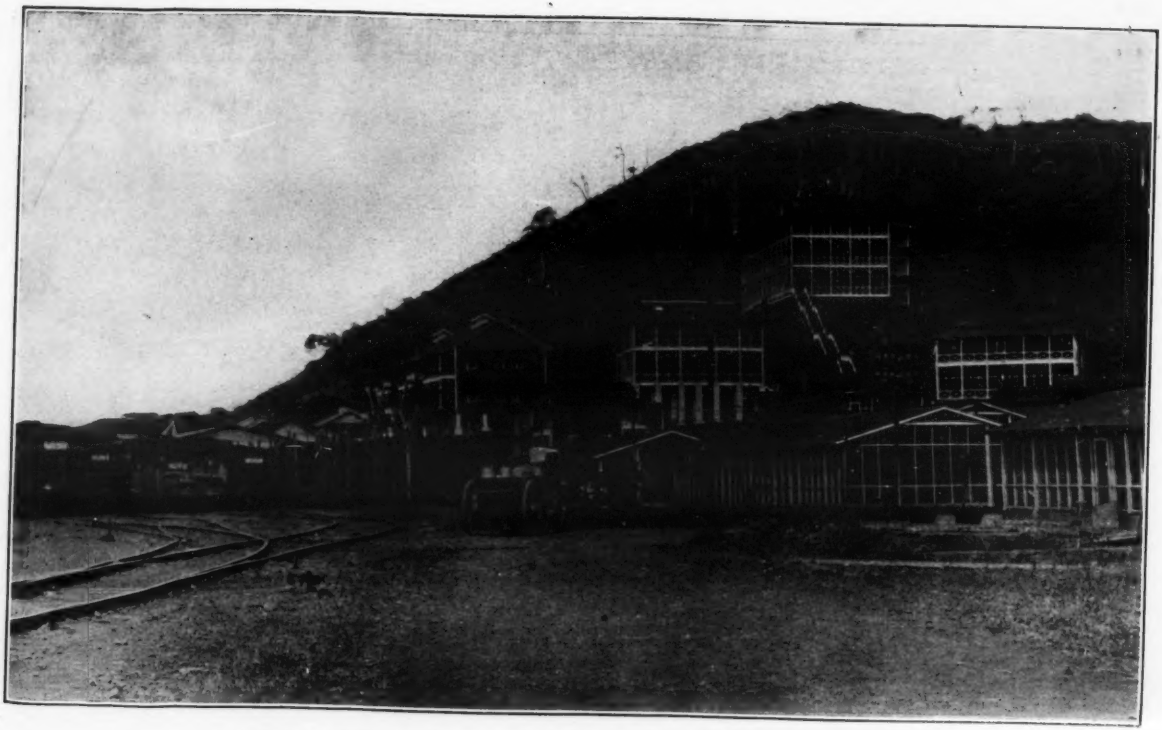
Colquhoun wrote in his "Key to the Pacific," "It will bind together the remote sections of that immense country, assimilate its diverse interests, go far towards solving many difficult problems and make the United States still more united. . . . No greater impulse to commerce can be given than this complement to the Suez Canal. It will benefit America in an infinitely greater degree than Europe. . . . It will give an immense impetus to United States manufactures, especially cotton and iron, and will greatly stimulate the shipbuilding industry and the naval power of the United States."

The United States will undoubtedly be more largely benefitted by the canal than any other country.

The chief products of the Southern States are cotton, iron and coal. The opening of the canal will give a tremendous impetus to the trade in these manufactures all along the Pacific coast. Nowhere in the world can iron be produced cheaper than in Alabama. The iron machinery and hardware of Birmingham and the steel of Tennessee will be found in increasing demand all along the Southern coast. The rapid increase in cotton manufacturing in Japan will receive additional momentum. The coarse cotton fabrics manufactured by the many mills in North Carolina, South Carolina, Georgia, Alabama, Mississippi, Louisiana and Texas are particularly suitable for use in the Central and South American states, Asia, Hawaii and the Philippine Islands.

The South will have a shorter and easier route either by way of

East chamber, upper lock, Gatun.



Homes of the employees. They dot the hills and higher places all along the line of the canal.

the Mississippi River from New Orleans, or from the many ports on the Gulf of Mexico directly to Colon than any other section of the country. The shorter route, lower freight, quicker delivery, must all conduce to increase business and improve trade. Coal is another great industry in the South that will be highly stimulated by the opening of the great canal.

Panama is destined to become the largest coaling station in the world. Only a change in the fuel for the propulsion of boats can prevent it. The coal from West Virginia, Kentucky, Tennessee and Alabama will find a ready market at Panama.

The industries of the Eastern and Northeastern States are more varied than those of the Southern and Pacific States. Everything almost that is used anywhere in the world is manufactured within a radius of five hundred miles, taking Pittsburg as a center. The manufactures of iron and steel, of ponderous machinery, implements and tools, electric appliances and apparatus, the finer cotton fabrics, textiles and prints—all the goods that have heretofore gone to the Orient by way of the Suez Canal will now find a route through the Panama Canal.

The Political and Military Effect. The primary purpose of building the Panama Canal was to benefit the commerce of the world, and incidentally to promote our own interests in the countries bordering on the Pacific Ocean. Our people, however, also realized that the time had come when the isthmian passage between the oceans had become a military necessity; that the need of a short route from ocean to ocean was imperative. The journey around Cape Horn by the battleship Oregon to join the Atlantic fleet could not be safely repeated with a hostile fleet on our eastern shore. Without the waterway across the Isthmus of Panama it would be necessary to maintain two squadrons when one of half the size will now suffice. The saving in that item alone will in less than a decade far exceed the expenditure made for the canal.

It will be essential to the safety of this country as well as to the commerce of the entire globe that the canal be protected by those who have built it. The nations of the world perceive the wisdom and commend the justice of our Congress in providing fortifications at each end of the canal for that purpose. There is no provision in the Hay-Pauncefote treaty that precludes or prohibits it.

While in Panama, our able Chargé d'Affaires, the Acting Minister from the United States, Hon. William W. Andrews, gave a

complimentary dinner to the recently elected President of Panama. There were present fourteen diplomatic representatives of other countries. I had the good fortune to be one of the guests, and was assigned a seat between Sir Claude Millett, Minister of Great Britain, and Antonio B. Agacio, Consul-General from Chile. Nearly all of the Central and South American States were represented. I was gratified to hear the many expressions of good will toward our country that were made, the high appreciation felt for the colossal work being done at Panama, the blessings it would confer on the Latin-American republics, the boon that it would prove in introducing that part of the world to modern civilization, and the improved social conditions sure to follow. I was surprised to find that they regarded it as principally a philanthropic work, undertaken by the greatest nation of the world for the benefit of mankind. All agreed that only the United States was equal to the task of its construction.

In a little while the thought and hope of the world for four hundred years will have become an accomplished fact. The two continents of the Western Hemisphere will have been cut in twain. What changes have transpired since Spain first conceived the possibility of this waterway! Then our country was a wilderness; to-day it is a center of learning, art, manufacture, science, commerce and finance. Spain, then in the zenith of her glory, the splendor of her courts the surprise of the world, invincible on sea and land, has seen almost all her possessions fall away from her. While we contemplate her condition with sympathy, we are not unmindful of the part she took in the discovery of the new world and that it was she who first expressed the wish to do what has come to be entrusted to us.

It is a remarkable coincidence that the canal will be built and the work completed just 100 years after the Cortes of Spain passed the bill authorizing the construction of a passage across the Isthmus of Panama and four hundred years from the discovery of the Pacific Ocean by Balboa.

JAPANESE COLONIAL METHODS

By ELLEN CHURCHILL SEMPLE

When Japan does anything, the world looks on in an attitude of respectful attention. For Japan has given even the Western world a lesson in efficient methods and effectual results. It is therefore with some hesitation that we venture to chirp a criticism of her colonial methods, and that on points fundamental to successful colonization. We frankly admit that those methods are on the surface highly scientific—too scientific; that they are carefully elaborated and faithfully applied; that they are animated by an intelligent and beneficent spirit to protect Japan's new subjects and to develop the resources of the newly acquired lands, with economy both to those lands and to the home Government. But when all this has been said, the facts still justify the question whether Japan's colonial policy is not calculated to defeat the great national purpose which should underlie all colonization schemes.

Emerson says: "That which each can do best none but his Maker can teach him." This is eminently true of colonials. These builders of empire act best on individual initiative. In them the *laissez-faire* policy finds ample justification. But Japan's policy makes no allowance for certain natural forces which see farther into the future of national development than the most intelligent Governments. Indeed, it has the colonizing instinct of its people by the throat.

Political expansion has since 1895 acquired for Japan about 110,000 square miles of territory, into which ethnic expansion should follow. The new territories are not, according to Japanese standards, densely populated, even in the cultivated districts, and they contain vast tracts of forest and waste land. Moreover, with the exception of Karafuto, the Japanese half of the island of Sakhalin, they are well suited in point of climate for Japanese colonists. Korea has a climate superior to that of Japan proper, and Formosa, though bisected by the Tropic of Cancer, in its capital Taihoku shares the mean annual isotherm of 70° F. with New Orleans and northern Florida. Colonists from the sub-tropical islands of Shikoku, Kiushiu and Liukiu, where popula-

tion ranges from 455 to 530 to the square mile, would find a tolerable climate and desirable space in Formosa, where they could pursue familiar lines of agriculture. Yet emigration from the home islands to these natural fields of expansion has almost from the start been checked or retarded by the Government's colonial methods.

The cause is not to be sought in any dearth of surplus population, that raw material of colonies. Hardly another country needs so much untrammeled colonial expansion to relieve the pressure upon its local supply of food and land. When we say that a population of 51,591,400 souls live on 147,655 square miles constituting Japan proper, and that they show a density of 350 to the square mile or a little less than that of the United Kingdom (373 to the square mile), this statement fails to reveal the most important facts. Geographic conditions make the Japanese fatherland a typical stepmother, doling out food to her children with niggardly hand. Two-thirds of its area, small at best, is covered with rugged mountains unfit for agriculture and useless for pastures, because the native bamboo grass, which is not only innutritious but also deleterious even to sheep, chokes out all imported fodder crops. Hence about 72 per cent. of Japan's area is in forests. The coastal plains are narrow, and the alluvial valleys are scant. Considerable tracts of the lowland hem of the islands are desolate rock wastes, owing to the detritus brought down by inundating mountain torrents in the rainy season. The sharp relief of the country and the heavy precipitation during the summer monsoons combine to make the rivers carve out narrow V-shaped valleys that offer a slender foothold to agriculture.

The effective area of Japan for food purposes is further limited by the infertile character of the soils. The volcanic nature of the country has been a disadvantage. Widespread ash-rains from the late Quaternary period have overlaid and ruined otherwise good land. The volcanic soils are poor or mediocre, except certain limited districts of weathered lavas and basalt which are the most fruitful in the islands. Granitic soils, poor in plant food, cover a large area; but since they readily absorb fertilizers, they are made productive by the laborious tillage of the Japanese peasant. Only the climate of Japan, with its warm sun, its abundant and well-timed rains, and its freedom from untimely frost, is the reliable ally of the toiling farmer.

With the means at his disposal the Japanese farmer has done his utmost. Geographic conditions in islands usually apply the spur to agriculture. Tillage begins early to assume an intensive

scientific character, in order to feed an increasing population from a land area that cannot be increased. The inelastic, sea-drawn boundaries of the Japan archipelago have resulted in a precocious development of agriculture, and have given it an economic, national and esthetic importance hardly to be found elsewhere. The farmer takes a high rank in the social scale. Though ignorant of scientific reasons, he has worked out a system of tillage that is wonderfully effective. He has succeeded in making a naturally infertile soil highly productive by intensive labor,—by deep-down cultivation, abundant irrigation, and especially by repeated manuring during the development of the crop. Practically without cattle and stock to furnish manures, he relies chiefly on night-soil as the obvious substitute in these densely populated islands. Long experience has taught him how to treat this in order to get the best results; to apply it to the soil at the moment when the constituent elements are chemically most available for plant food, and before the compounds have lost ammonia by excessive decomposition. Hence his practice long ago anticipated the laboratory results of European scientific theory. Fallow fields have no part in his system; his tillable land is too small. Intensive culture, dense population, high percentage of the farming class, and small arable area in Japan have combined to produce minute land-holdings. Dwarf farming prevails. Apart from the colonial country of Yezo, the chill northern island, 1 hectare, or 2½ acres, is the average farm per family. In 1908 over half the peasants tilled less than 2 acres, while only 1 per cent. of them held more than 12 acres.

Owing to disadvantages of relief and soil, arable land forms to-day only 14.37 per cent. of the total area of Japan proper. Ten years ago it formed 13.7 per cent., and in 1887 it was 11.8 per cent.; so the extension of the arable area proceeds slowly, despite growing pressure of population, progress of science, and encouragement on the part of the Government. The inference is that it has probably reached its limit. This small percentage of arable area means that the Japanese population of nearly 52,000,000, over 60 per cent. of whom are farmers, lives chiefly from the products of 21,218 square miles of its territory. A fact like this puts a new aspect upon the density statistics of Japan. Italy has a population of 314 to the square mile, as opposed to Japan's 350; but Italy has 49 per cent. of her area devoted to agriculture. Japan's density is nearly double that of fertile and thrifty France, with 58 per cent. under tillage; and it is triple that of Greece, whose 18.4 per cent. of arable area shows a proportion comparable to that of ill-favored Japan, but is

reinforced by extensive pasture lands. Switzerland's density is only two-thirds that of Japan; but the Alpine state has the 16.1 per cent. of its area which is under tillage supplemented by the 36 per cent. used for hay meadows and highland pastures. This advantage is, however, balanced by Japan's maritime location and abundant fisheries—those pastures of the sea.

Active emigration from all these European countries except France indicates that their respective territories, under existing economic methods of production, are saturated with population. Japan, with a greater nominal density and a vastly greater actual density, as well as a larger population to draw from, finds its emigration since 1908 narrowly restricted by Government measures, especially emigration to the United States, Canada, Mexico, and Hawaii. Count Komura, Minister of Foreign Affairs in 1909, explained this policy of the Government as a purpose to avoid all international friction which might militate against Japan's growing international trade; and furthermore to keep the Japanese in the Far East, instead of allowing them to scatter at random in foreign lands, thus concentrating them in the extended fields of activity recently opened up by two successful wars. A natural inference from this statement is that Japan regards its redundant population as useful colonial material, and is prepared to make the most of its colonial opportunities; yet, as a matter of fact, the natural outlet into these new colonial lands has been blocked.

Recent developments in Japan have created an urgent need for such an outlet. From time immemorial the farmer class has constituted the main productive power of Japan. Agriculture is still the chief basis of the national finance as in a medieval state, but it now sustains a crushing burden of taxation, because Japan has launched upon the expensive career of a modern world power. The infant industries and commerce need the coddling of light taxation. Farms must pay from 15 to 19 per cent. of the total yield as land tax alone, besides certain other local rates. Dwarf holdings can ill afford such a drain. Hence peasant proprietors are disappearing at an alarming rate; they are forced to mortgage their farms, which soon are absorbed into the larger estates and let out to tenants. In 1908 tenants tilled one-half the paddy-field area and 40 per cent. of the upland farms. Since they must pay from 45 to 57 per cent. of the total yield as rent, only by employing the whole labor force of the family, by maintaining a low standard of living, and often by combining with tillage some subsidiary occupation, can they earn a precarious subsistence. As the taxes of the Japanese farmer have

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increased, his revenues have diminished, because of foreign competition. The tea of Japan finds its market progressively restricted by the growing production in India and Ceylon; its beans are being crowded to the wall by the great Manchurian export from Dairen, while its indigo, cotton and hemp crops have almost ceased to be remunerative. Only large-scale production can stand the large-scale competition of the world markets. Dwarf farms in Japan must go. The dislodged cultivator, if he remains a farmer, must seek the larger fields of Japan's colonial lands, there to practice modern large-scale tillage.

Japan has long had a genuine colonial or frontier region in the northern island of Yezo or Hokkaido (36,000 square miles), whose land reserves present on a small scale a parallel to those in the western part of the United States and Canada, though both soil and climate leave something to be desired. Its population in 1908 was only 30 to the square mile, after a steady stream of emigration from old Japan since 1896 had brought in about 700,000 souls or two-thirds of its present population. Of the 80,578 Japanese immigrants to the Hokkaido in 1908, nearly half came from North Hondo, a province only half so densely settled as the central and western provinces of the same island. But the relatively remote and segregated location of North Hondo, on the far side of the central mountain barrier of the island, had made it the earlier colonial district of old Japan. These northern Japanese, inured to a relatively harsh climate, accustomed to the tillage methods of the north, and divided by only a narrow strait from Hokkaido, were more easily attracted than the southern Japanese by the large tracts of available land and its teeming fishing grounds.

Hokkaido bears to-day all the marks of a typical frontier or colonial district. It is distinguished by the large allowance of 7.6 acres of tillage land for each farmer household, as opposed to 2.54 acres in Hondo. It is furthermore the important stock-raising district of the Empire, both on account of its abundant land and its suitability for grass crops. The island, according to official estimate, can support at least five times its present population. The state lands disposed of during the thirty-six years prior to 1907 amounted to 3¼ million acres, and as much more remains for purchase or lease, by settlers. The terms are easy, both as to price, which is nominal, and to the planting and building to be done within a period of years upon the land purchased or leased. An individual may buy tillage land to the amount of 1,250 acres, forest and stock-farming land up to 2,000 acres. Small settlers may get 25 acres

of land gratuitously on certain conditions; when they have satisfactorily finished work for the land acquired, they may purchase or lease more within the same limit. These are really munificent terms for Japan, a country used to dwarf farms, trained to the small territorial scale imposed by the cramped environment of the original islands.

Here we have genuine internal colonization. The large number of women among the immigrants point to permanent settlements and orderly households. About two-thirds of the annual accessions to the population of Hokkaido belong to the farmer class. Abundant land, acquired under the easy conditions appropriate to a colonial territory, is an attraction strong enough to outweigh the rather forbidding climate. Hokkaido, exposed to the wash of polar currents, has even in its southern half a mean annual temperature of barely 45° F. Its growing season is limited to four months, when the temperature averages only 63° F. The farmer of central or southern Japan, who is accustomed to count upon seven or eight growing months, with a mean temperature ranging from 70° to 76° F. in the hot season, needs a strong inducement to face the bleak climate of Hokkaido. These inducements the Government has wisely supplied. To the over-taxed Japanese farmer especially grateful is the exemption from taxation. In 1909 some 1,650,000 acres of allotted land in the island were free of taxes for a term of years. In Hokkaido, Japan has demonstrated her understanding of a genuine colonial policy, which aims to make solid ethnic expansion follow and overtake the previous political expansion. But her failure to apply the principle elsewhere in her new subject lands arouses the suspicion that it was chiefly an adverse climate, seconded by the obvious impossibility of otherwise developing this remote northern island, that forced Japan to this large colonial policy.

Her previous history had not trained her for such a policy. At this difficult trade she had served no apprenticeship, contrary to the experience of most island nations. The anachronism in her history was the policy of seclusion, adopted in 1624 and rigidly maintained for almost 250 years, by which all emigration and foreign trade were prohibited. By the more obvious laws of geographic probability, seventeenth-century Japan, like ancient Crete and modern England, should have colonized broadly and carried on an active maritime trade with her neighbors. Her small area, limited food supply, and sea-drawn boundaries, seconded by the possibilities of her tea and silk trade, should have forced her into commerce to feed

her growing population, especially since in previous centuries she had reaped the benefit of an Asiatic trade, reaching from the mouth of the Amur River to India, and had, moreover, developed the merchant marine wherewith to conduct it. This was the immediate effect of her maritime accessibility, favored by her insular location close to Asia on the rim of a marginal sea, of her indented shore line, her well-populated coasts, and her sea-bred nautical efficiency.

But in 1624 Jesuit intrigue to overthrow the Government, and possibly to hand it over to Catholic Portuguese rule, threatened Japan's political integrity and gave sudden alarm to that jealousy of outside interference, that ineradicable instinct for aloofness, which had been bred in the people by their segregating island environment. Japan adopted and maintained for so long a policy of seclusion because her insular location both suggested and facilitated it. But she submitted to the isolating effect of that location up to the danger-point. Small, naturally-defined regions protect a nascent civilization from outside attack and help to give it a definite aim by counteracting the primitive tendency towards dispersal; they force it to exploit the group of geographic conditions and the economic resources of the home area without wandering far afield searching for lines of less resistance; but in doing this they run the risk of teaching too well their lesson of concentration. In course of time geographic enclosure, like that of medieval Japan, begins to betray its limitations.

The size of a people's territory influences their estimate of area *per se;* it tends to fix the proportions of their territorial expansion and the scale of their private land holdings. A farm in Argentine or a ranch in western America would be a principality in Greece or Italy. A people embedded for centuries in a small natural district tend to measure area with a pocket foot-rule: the surveyor's chain is too big for their diminutive national purposes or their dwarf farms. This is the striking psychological effect of a narrow local environment. Therefore a vital turning-point is reached in the history of any people bred in such a habitat, when it breaks away from the clutch of its confined environment, and from a small, self-dependent community launches upon a career of conquest, colonization, or any form of wide territorial expansion. This is the significance of England's vast outreach from the sixteenth century onward. There is no more telling fact in the history of the English in America than the rapid evolution of their spacial ideals, their abandonment of the cramped territorial conception brought with them from their island home and embodied, for

example, in that petty land grant, fifty by a hundred miles in extent, of the first Virginia charter in 1606. The next colonial grants were bounded by parallels of latitude and the setting sun! Cosmic boundaries are not too big for the colonial standpoint. Every accession of territory to the Thirteen Colonies gave a new impulse to growth. Expansion kept pace with opportunity. Only in small and isolated New England did the contracted provincial point of view persist. It was sloughed off soonest in the broad tidewater plains of Virginia. There colonists who learned the economic value of "skimp farming" under the tutelage of slave labor, and therefore took up large tracts of land for their plantations, lent themselves best to the national purpose of expansion.

Japan reached a great turning-point when she was stirred out of her apparent insular complacency by the Russian advance, and entered upon a career of expansion. Since 1895, when her new territorial policy was inaugurated by the acquisition of Formosa, her history reminds one of those explosive seed-pods which at maturity suddenly burst at a touch and scatter their seed abroad. She has acquired in ten years a colonial area nearly equal to that of the home archipelago, and she holds Manchuria with a grip that she does not expect to relax.

Such political expansion would seem to indicate a rapid growth of Japan's ideal of territorial aggrandizement. Very true; but unfortunately the ideal is only skin-deep. It has not permeated the economic and national purposes of the Government, to vitalize and stimulate them; and the Government, still suffering from a mental cramp, is checking the natural and healthy colonizing instincts of the people. Meanwhile, the big colonial territory, in which Japan's large and vigorous surplus population might so easily realize a great national purpose of planting a new Japan on the new soil, is being administered by the Mikado's Government as if it were a fresh suburban addition to a growing town, exploited according to the methods of the average real-estate agent. While the authorities, with the national genius for administration, are organizing schools, courts, sanitation, reforestation, railroads, frontier defences, and surveys of the vast Government lands in the new dependencies, to the emigrant from the home islands they offer no opening in the big task of colonial development. They bestow elaborate attention upon the newly-built hive, but drive off the swarming bees.

Let us consider first Karafuto, the Japanese holding in Sakhalin, as presenting the simplest conditions. Karafuto contains about

12,000 square miles of territory, unoccupied at the time of its acquisition except for 300 Russians who were too poor to leave, and about 2,000 aborigines. Handicapped by the same zonal location and climate as Newfoundland, it is a typical penal island. As a colonial proposition it would require a sugar-coating process to make it go down. The sugar is there in the form of abundant state-owned lands and excellent fisheries, to be applied with a generous hand. What do we find? Japanese to the number of 61,800 crossed over to the island in 1907 and 1908; one-fourth of these were females, a proportion that suggests a body of permanent settlers. But emigration must have been almost as active as immigration, for at the end of 1908 Karafuto contained only 23,139 Japanese. About a thousand families of these (4,000 souls), "in compliance with special inducements offered by the Island authorities"—we quote the official report—settled on the land deserted by the Russians, at the rate of about 5 acres per family. This allowance of tillage land is far more niggardly than the average of 2½ acres constituting the dwarf farm of temperate and subtropical Hondo, considering the harsh climate, short growing season, and less profitable crops (oats, rye, beans and tubers), in Sakhalin, whose mean annual temperature is only 41° F. Though the plains of Karafuto, according to official estimate, contain 112,500 acres of tillage land and 137,500 acres suitable for pasturage, and though practically all of this is state-owned, it is measured out to the settler on a cramped, foot-rule scale disastrous to colonial development. The peasant on his poor 5-acre farm in Karafuto finds nothing to compensate him for exile from warm and beautiful Japan, so he does not remain.

The close adherence of settlements to the sea-coast of Karafuto suggests that the colonial ekes out his crops by fishing. Fisheries are the important resource of the island, but they too are administered in an uncolonial manner. Nowhere are they free. Seine fishing is permitted only on special grounds and by special license issued for a certain number of years. Ordinary licenses are issued for 1,300 distinct fishing grounds, the rights to which are sold at public auction. On other grounds fishing is restricted, and on others again it is absolutely forbidden. These regulations may answer some purpose to conserve or distribute the fisheries, or to exploit them for the national revenue; but what is good for fish or finance may prove destructive to a large colonial policy,—to the colonial spirit of initiative, of untrammeled enterprise, of desire to do things on a big scale, and to carry them through with a rush

and a shout in a manner which is called American, but which is simply colonial.

The land policy of the new Government in Korea reveals the same foot-rule standard, imported from the narrow and crowded conditions of the home islands. The density of the population in Korea, according to the last census, is only 154 to the square mile, as opposed to 350 in Japan. The tilled land constitutes only 10 per cent. of the whole peninsula, or half the area that might readily be brought under cultivation. It is estimated that the country by an extension of its agriculture could support an additional population of seven millions. Korean soil consists largely of a light sandy loam, disintegrated lava, and a rich, stoneless alluvium often many feet deep. The rainfall is well-timed and adequate; the country rarely knows droughts or floods. Ample facilities for irrigation and long warm summers afford favorable conditions for the all-important rice culture. Korea has an area of about 84,000 square miles and a population of nearly thirteen millions; but it can undoubtedly support in addition no small part of the surplus population of Japan. Immediately after the Chinese war, in 1895, there was an exodus from the home islands to the peninsula. Yet at the beginning of 1910 only about 145,000 Japanese were settled in Korea. What has checked the rush?

There is no dearth of public lands. The Government owns 319,800 acres of farm lands which is let to tenants, and in addition about 3,000,000 acres of waste land, which is susceptible of cultivation. In order to develop the waste tracts, the Government resorted to leases, a system advisable in colonial countries only as an adjunct to free grants of lands, and those generous ones. A law passed in July, 1907, provided for the lease to any person of state-owned waste land at a nominal rental for a term not exceeding ten years, for tillage, stock-breeding, or afforestation. Up to January 1st, 1911, since the passage of this law, 925 Japanese applied for a total of 205,000 acres. Only eighty-three of the applications were honored, and they received a total of 9380 acres. Koreans, at the same time, to the number of 1176 made applications for the lease of 183,600 acres, but only 133, or about 11 per cent. of them, received 14,900 acres, or a per capita allowance of 112 acres on lease. But during this period of three and a half years certain previous leases to twelve Japanese and thirty-seven Koreans, covering 13,440 acres, were disallowed and the land recovered, so that only 10,840 acres were thrown open to settlement

for 167 lessees. This system, as put into practice, therefore offers scant encouragement to colonists; it is rather a methodical rebuff.

A letter to the writer from the Secretary of the Governor-General of Korea assigns various reasons for this reluctant application of the ten-year lease system. In some cases the tract applied for had to be preserved for the future development of the whole locality; or its use would entail hardship upon neighboring fields because of insufficient water for irrigation, or because its wild growth furnished fuel, thatch and fertilizers to the neighboring settlements; or the applicants themselves had not adequate means to develop the land, and merely wished to lease it for speculative purposes. Though the Government declares its intention to honor as many applications as possible, still the impression remains that we have here a policy of expansion cramped by precedent established in a small crowded territory where land has more value than men; that such a policy ought to be superseded by the true colonial outlook of a new territory, where men are more valuable than land, where land is useful primarily to attract men, and therefore should be given to them freely, coupled with additional inducements to settlers, like free transportation of family and effects. So much for the ten-year lease system in Korea.

The same short-sighted, uncolonial policy is revealed in the sale of land; for the Government has gone into the real-estate business, which it conducts upon canny principles. It operates through the Oriental Development Company, a big stock company organized in 1908 by the Japanese Government and private shareholders to exploit the resources of Korea. The Government nominates the President and two Vice-Presidents, and it holds nearly one-third of the capital stock, for which it has put in an equivalent in state-owned lands. It also pledges itself to lend the Company financial aid not to exceed $150,000 annually for the first eight years. The "Rule for Settlers," issued by the Company in September of 1910, is significant, because it embodies the old dwarf land scale current in Japan. Settlers may become either peasant proprietors or tenants. The first class may lease paddy fields and dry fields to the total amount of 5 acres per family, and by the payment of annual instalments become owners in twenty-five years. These instalments are fixed high enough to cover in this period the current market price of the land, which averages about $25 per acre for dry fields and from $40 to $50 for paddy, and in addition a 6 per cent. interest on its value, which is considered as an advance. Meanwhile the settler must pay the land tax and all other dues upon his

leasehold. Tenant settlers pay a fixed rent for their land, but they are allowed to buy it eventually, if they prove to be respectable and industrious. Peasant proprietors who have given proof of a similar character may apply to the Company for the purchase of land up to 12½ acres, including their original holding; but this estate represents the rather pitiful summit of colonial ambition in Korea.

Nor are these the only restrictions. Settlers must be over twenty years of age, free from military service, and must bring their families with them. The Company in turn will advance them money up to $100 per household for their initial expenses, such as building the home, but it exacts 7 per cent. interest on the loan and repayment by annual instalment in twenty-five years or less.

What was the response to these munificent colonial offers on the part of Japan, which has to-day about 420,000 enterprising subjects living in foreign lands? In the year 1910-1911 the Oriental Development Company received 1235 applications from would-be settlers; only 160 of these were approved, and they received barely 4 acres per family. The Thirteen Colonies and Canada and German Poland would have made slow progress by such methods. The official explanation of this apparent reluctance to carry out the avowed purpose of the Company is another and higher purpose to admit only model farmers from Japan, in order to set up a high standard to Korean cultivators. Various applicants were therefore rejected because of their inexperience in agriculture, or inadequate capital, or undesirable personal character. To the outsider, the big national land reserve here, as in Sakhalin, is being handled as if it were the asset of a business corporation looking to well-secured dividends. The larger national enterprise of genuine colonization, with its rapid increase of national wealth, is neglected in this petty retail trade.

But there is the other consideration of the native Korean population and the improvement of their tillage methods. The Japanese settlers are to be glorious examples. This is not a congenial rôle to colonists. Indeed, the efficient colonist is often an untamed spirit, impatient of restraint, rebellious against precedents, but keen for making his own methods on a remote or dangerous frontier, like the unpeopled Diamond Mountains of Korea or the savage border of the Formosan Highlands. Moreover, the glorious examples will prove effective means to stimulate backward Korea only when they are numerous enough to intensify competition. Competition is brutal, but it is the only method that can be relied upon to do the work. Moreover, there is another question—whether Japan can afford the slow and costly process of raising those thirteen million

Koreans to the Japanese standard of efficiency, till they can finally reinforce her strength, or whether it were wiser to transplant Japanese colonists on a big scale to the unoccupied public lands of Korea, there to increase to a second Japanese nation. There, given a free hand, encouraged in their spirit of initiative and not thwarted, they can be trusted to develop a colonial type of character with the comprehensive mind of colonials—men of vision for big national schemes, of power to instill into the nation new ideals and new forces of political expansion, such as Japan will need in the future, if she is to hold her own in the East.

From this abortive system of colonization we turn with admiration to Japan's administration of Korean affairs and her efforts in behalf of her Korean subjects. We see her sending the whole nation to school and putting it through a regular curriculum with a view to graduation. Her task is easier than similar national tasks in the Philippines, Java and India, because Japan is dealing with a kindred people, living in a neighboring territory under familiar climatic conditions, having an allied civilization, and, what is more important, capable of being embodied in the body politic of Japan. The question which the Japanese authorities are facing with intense earnestness is this: Whether the despised Koreans, a "Nation of Cowards," as they have been called, brought to the verge of racial and political decay by centuries of misrule, are susceptible of such moral, physical, intellectual and industrial regeneration as will make them a force in Japan's struggle for military and economic supremacy in the Far East. That they can be so regenerated is Japan's hope. The Koreans are regarded as a new national resource to be scientifically developed. Therefore Japan is attacking her problem with a courage, devotion and insight that argue well for her success. She is trying to correct the early mistakes of 1905, when camp-followers and riff-raff streamed into the country in the wake of the army of occupation, before military control had been superseded by an orderly civil government; and she is entrusting the difficult task of reorganization to officials of high character.

The Koreans are docile, amiable, lazy, ineffectual. Centuries of oppression and over-taxation have robbed them of all economic incentive. Their ideal is "honorable idleness"; and to them all idleness is honorable. The coolie class is physically well developed and capable of severe labor; but these, like the middle and upper classes, seem possessed by a deadly inertia. A high official in Seoul said recently to the writer: "These people lack will-power. All we can do is to teach them better methods of agriculture and

industry, secure to them the profits of their labor, and thus gradually lift them. But the hardest thing will be to supplant their ideal of idleness by one of activity."

To this end the Japanese are devoting their attention to the children. They seem to have adopted for their motto Emerson's great saying: "Youth comes ever towards us with salvation in its hands." Common schools are being rapidly established over the whole country, middle and normal schools in the towns and cities, agricultural schools and experimental farms in various places, and agricultural classes embodied in academic courses of study. Textbooks compiled by the educational department are sold for a few pennies or distributed free. For the first time, apart from what the mission schools could offer, the Korean girls have an equal chance with the boys. Think of the boon to that unrecognized half of the Korean race, which was previously deemed unworthy to receive personal names! Their education consists in a wise combination of common school branches and varied industrial training; and it calls forth an eager response that is, to the onlooker, almost pathetic in these little daughters of a dulled, sodden, nerveless race.

The boys' schools provide not only a full course of study, but every stimulus in the form of physical training to overcome Korean inertia. Military drill, football, baseball and tennis are pushed to the front, in order to arouse ambition and the corps spirit, which the native lacks. The purpose to develop in the Korean the manly qualities of the soldier is everywhere apparent. The writer asked an army officer in Pyong-yang Province: "Will you ever be able to make soldiers out of the Koreans?" He replied: "I don't know, but I hope so, if we can begin their training young enough; but up in this section, near the frontier, we must have wholly reliable troops."

The traveler in Korea is impressed by the ineffectuality of the people, their blank and purposeless expression, their feeble and awkward use of tool or implement, their inability to direct their muscular effort except in crude coolie labor. He listens, therefore, with surprise and some admiration to the Governor of Pyong-yang, an intelligent and big-hearted man, who maintains that the incapacity of the Koreans is the result of neglect, that with training they can attain the same technical efficiency as the Japanese, and under proper guidance their products can soon enter the world markets. And as, all eagerness and hopefulness, he described the

methods by which he expected to accomplish this result among his people, one felt that this ruler of a remote northern province was an artist and an economist, but above all a teacher. Devotion, courage, and dogged perseverance in the application of tested methods of development characterize the Japanese officials in Korea. The quality of the natives does not lead an outsider to envy these national educators their task.

Education goes on also outside of school and workshop. The Japanese have accomplished wonders for the public hygiene. Medical schools, hospitals, vaccination stations and modern waterworks for the big cities are being rapidly established. Sanitary associations attend to cleaning streets, removing garbage and sewage, and raising the standard of cleanliness on private premises. The reeking, filthy, malodorous Seoul which Mrs. Isabella Bird Bishop described in 1894 is a thing of the past. In the towns and the neighboring country districts, a continuous spring-cleaning goes on under the supervision of the police, those able apostles of Japanese civilization. Though only the streets and courtyards of the rural village come under their sanitary jurisdiction, they manage somehow to inject the spirit of cleanliness also into the interior of the mud-walled homes.

The well-water in Korean towns often causes epidemics, owing to infiltration from stagnant drains and cesspools. The water from the small polluted streams in the thickly populated coastal plains is little better. Therefore modern waterworks and filter systems have been built in the five large cities, either by the central Government or by the Japanese municipalities with Government aid. After the installation of the waterworks in the city of Pyongyang, it became necessary to forbid by law the sale of the foul river water by the public carriers, in order to force the people to use the pure supply.

The law has had to step in also to educate the Koreans in a respect for forests. For centuries the hills and mountains, now bare and often eroded down to the underlying rock, have been stripped of their trees for fuel. Large timber has disappeared, except for a patch here and there. The young sprouts from the old stumps have been regularly cut in the fall and tied into bundles for firewood. Now all is changed under the direction of an expert Japanese forester. Though he has been at his task only since 1907, already little pine trees begin to dot the surface of the bare slopes. But these infant forests have to be policed, a difficult

undertaking in a large area, for the Koreans still resort to their disastrous practice of cutting the saplings, and only by repeated arrests can they be taught to respect the integrity of the forests. Everything is done to encourage the natives to reforest their own waste lands. Young trees to the number of half a million and many bushels of seeds were freely distributed in 1909 from six forestry stations, and object lessons are furnished in the model afforestation carried out on terraces or slopes about Seoul and other large cities. The little pom-poms of green that now dot the bare hills and give promise of future forests are typical of Japanese efforts for improvement in this decadent country.

In Formosa, colonial administration found a complex problem, for which in the main it has worked out a wonderfully successful solution. When Li Hung Chang, the Chinese Plenipotentiary, handed over Formosa to the Japanese at the Shimonoseki conference in 1895, he offered them his condolences on their new acquisition. Under Manchu rule, Formosa had been notorious for the turbulent character of its Chinese population, the widespread brigandage, the prevalence of the opium habit and fatal malaria, and finally the head-hunting savage aborigines, who were a constant menace to economic development. The outlook was not encouraging.

The Japanese found the area of the island about equally divided between three million Chinese who had appropriated and tilled the fertile western lowlands, and the Malay savages, who, though numbering little over a hundred thousand, maintained themselves in the fastnesses of the eastern mountains, and from this base made depredations upon the frontier. The Chinese population contained many fugitive lawless elements, who either reformed amid the large opportunities and free life of this colonial island, or were recruited into the bands of the professional brigands. These bands were also reinforced at the time of the Japanese acquisition by insurgent Chinese who refused to submit to the new authorities. But the security to life and property guaranteed by the orderly Japanese rule appealed to the industrious Chinese and gained their allegiance for the Government. The brigands were either offered pardon and then systematically employed in some of the rough work incident to organizing a new country; or where incorrigible, were brought under control by force. To-day the country is quite free from them, where only ten years ago they assaulted the capital Taihoku, and necessitated an armed guard for every excursion beyond the city walls.

XUM

The opium evil has been curbed with equal success. To this end, the production and manufacture of opium were made a Government monopoly; thus the quality, quantity and distribution of the drug was controlled. Then the efficient Formosan police took a census of those addicted to the habit; thereafter only confirmed smokers were allowed to buy the drug, and that only in specified quantities, for the sale goes on under strict police surveillance. As a result of this method, the annual returns of the consumption of opium and of the number of smokers show a parallel decline, as the older victims of the habit die off. Thus the number, which was 170,000 in 1900, dropped to 130,000 in 1905.

The Japanese have coped with insurgents, brigands and opium smokers, but they have been in the main worsted by the swarms of Anopheles mosquitoes breeding in the widespread paddy fields of the Formosan plain. Malaria is responsible for about 20 per cent. of all the cases of sickness in the island, and for probably 10 per cent. of the mortality. In the capital, Taihoku, it is being successfully combated by a new model sewerage system and waterworks, so that this city has become comparatively a safe place of residence. Other towns are following its example. For this reason, the Japanese immigrants, who are found largely in the towns and cities, show a smaller mortality from malaria than do the Chinese, who are distributed through the irrigated plain. Malaria may explain the constant exodus of Japanese from Formosa and the small number of immigrants who remain in the island; their marked appetency for the liberal professions, trade, and technical industries,—all occupations appropriate to urban life; and their apparent reluctance to engage in agriculture, stock-raising, forestry, and even fisheries, all which together employ only 1.4 per cent. of the Japanese population of Formosa. It may be that malaria is going to prove the great obstacle here to genuine colonization, since it is chiefly the Japanese farmer class that needs an outlet.

The expansion of Japanese control into the Malay mountain section of Formosa, and the consequent problem of a belligerent savage frontier, are the result of interesting economic and geographic factors. That expansion has been stimulated and directed into the mountains by the growing demand in the world markets for camphor and tea. Ordinarily savage tribes are long left in undisputed possession of their mountain lands, because these usually repay cultivation only under heavy pressure of population from the plains. But the mountains of Formosa, on the contrary, have attracted

expansion, because they commanded a practical monopoly of the camphor industry, which has a limited activity elsewhere only in Japan. The *Raubwirtschaft* methods of the Chinese have, since 1790, steadily destroyed the camphor fields without replanting. Beginning at that time on the eastern frontier of the agricultural lands in the plains, they have pushed their camphor camps first into the foot-hills and then into the mountains, cutting down the forests and driving the savages farther into the highlands. The camphor question and the savage question are, therefore, identical, for the hill tribes, who resent this steady encroachment, raid the camps, destroy the stills, and massacre the workers at every chance, incidentally carrying off the heads of their victims, according to respected ancestral usage, to grace a wedding feast or a funeral ceremony.

As the forests fall and the camphor workers advance, in their wake come the tea planters to occupy the cleared lands. Hilly ground with an altitude ranging between 1,000 and 4,000 feet, a hot climate with an annual rainfall of 80 inches or more, and a light sandy loam soil combine to form ideal conditions for tea culture. These conditions were found in or bordering upon the savage territory of Formosa as early as 1868, and since that date they have been steadily exploited, at first under an official or volunteer guard of armed Chinese, and recently under the protection of the more efficient Guard Line of the Japanese; because the frontier of settlement is always the lurking place of the head-hunting savages, ready to commit depredations upon the frontier villages.

The needs of the camphor industry, which yields a large revenue as a Government monopoly, and the expanding tea culture, which, in 1908, accounted for over two-thirds of the total export receipts of the island, together keep the Japanese Guard Line constantly on the advance into the savage wilderness. In 1904 some 300 square miles of territory were reclaimed for civilization and development.

The Guard Line is a border outpost defence, designed to protect the settlements and curb the aborigines. Its striking and original feature is a wire fence, 5 feet high, the lowest wire of which is charged with an electric current strong enough to stun or kill anyone trying to climb over or creep under it. It stretches for over 300 miles through the mountains along the savage border, and it is guarded about every 500 yards by block-houses, in which are stationed armed police. The fence is cleared of brush for 30 feet on either side, so that no one can approach without detection. The savages are warned of the danger in it, and consequently few of

them have been killed; but the fence serves to confine them in their own area, and to cut them off from outside supplies, especially from salt. Thus the Japanese are able to put on the screw. Under the pressure of this need, tribe after tribe has submitted to authority, given up their arms, and allowed their territory to be included within the Guard Line. In return, they are given agricultural implements, seed, land for cultivation, and medicines when they are sick. They relinquish head-hunting, but in deference to tribal ideals use monkey skulls instead. The right of trade is conferred as a privilege upon certain tribes or certain individuals; it is restricted to necessary articles, from which firearms and ammunition are specifically excluded. It is cut off immediately if the rules are violated, or if the tribe become unruly. The agents in this wise and humane conquest of the savages are the police in the block-houses. These carefully chosen and carefully trained officers of the law distribute medicine to the sick, supervise disinfection, teach the savage children the rudiments of the Japanese language and manners, control barter between the savages and the common people, prevent the sale of guns, take observations upon aboriginal life, and gather information about tribal affairs. They exemplify the genius of the Japanese for adapting means to ends.

Economy of administration and the intelligent development of local production and industries enabled Formosa to be self-sustaining as early as 1908, so that the small subsidy annually granted by the hard-pressed national treasury in Japan could be dispensed with two years before the allotted time. The long list of Government monopolies in Formosa (opium, camphor, salt and tobacco) and of Government enterprises, such as railroads, camphor refineries, and irrigation works with hydro-electric power, have helped to achieve this end. But these monopolies naturally raise a question as to the effect upon opportunities open to Japanese immigrants.

The riff-raff from the home islands that flocked to Formosa, as to Korea, after the acquisition made difficulties for the Government and led them to discourage further influx. Those who came found the level land suitable for agriculture already fully possessed by the Anopheles mosquito and by the industrious Chinese, who showed a population of 415 to the square mile in the civilized area. The most lucrative occupations were already in the hands of the Government and of the Chinese. The door of opportunity was closed in the new colonial land. This was the condition which the would-be colonist found upon arrival; so he went back home. Hence the striking fact about Japanese immigration into Formosa is the ex-

cessive emigration, which steadily increased from 1898 to 1904, as the following table shows:

YEAR	ARRIVALS	DEPARTURES	INCREASE
1898	13,214	3,078	10,136
1899	20,743	7,903	12,840
1900	20,995	8,842	9,704
1901	17,841	14,054	3,787
1902	13,821	11,478	2,343
1903	15,892	13,149	2,743
1904	11,564	12,155	−591

The excess of departures over arrivals in 1904 is doubtless due, in part, to the recall of reservists for the Russo-Japanese war; but the table as a whole points to some persistent cause of discouragement to immigration. So do other statistics. The number of Japanese who, prior to 1905, had come more than once was only 2,383, or 2 per cent. of the total number of arrivals given in the table. This means that only a scant proportion of the big number who left ever came back. Apparently their survey of conditions in the island or their taste of Formosan life was not reassuring. It is furthermore significant that while women, from 1898 to 1905, constituted about one-third of the annual arrivals, in 1901 and after they formed over one-half of the annual increase. This is contrary to normal colonizing experience, which shows always a marked predominance of men.

At the end of 1905, after ten years of Japanese occupation, the Japanese citizens in Formosa numbered only 57,309, or less than two per cent. of the total population. Government offices and the liberal professions employed 40 per cent. of these, while agriculture, forestry and fisheries all together engaged only 1.4 per cent. This is the striking anomaly in Formosa, that a people with a gift and love for farming should avoid the occupation native to them and natural to every normal colonist. The Census of Population in Formosa for 1905 states that this scarcity of agricultural immigrants, in spite of rich agricultural resources, is chiefly due to general ignorance of the condition of the island; but this reason is not convincing. In a country where almost every person can read, and where newspapers are abundant, this ignorance could not long endure. Moreover, the 70,569 Japanese who went to Formosa and left again between 1898 and 1905 are certainly exempt from the charge of ignorance.

Making due allowance therefore for the competition of the Chinese

and the effects of malaria in a country of paddy fields swarming with mosquitoes, but also taking into consideration the extensive area of more healthful mountain land in Formosa reclaimed from the savages and devoted to tea culture, in which the Japanese excell, one cannot escape the conclusion that here, as in Sakhalin and Korea, Japanese colonial methods fall short at a vital point.

GEOGRAPHICAL ASPECTS OF THE NEW MADEIRA-MAMORÉ RAILROAD

By ISAIAH BOWMAN

The recent completion of the Madeira-Mamoré Railroad about the so-called "Falls of the Madeira" marks the close of a unique chapter in South American geography and history and the opening of a new and remarkable period of commercial development. The Collins railway scheme of 1878-1880 was the first practical attempt to solve the problem, though a canal had been talked of for many years. It followed the brilliant studies* by Col. George E. Church in which the Amazon route to the Atlantic had its most vigorous champion. With the tragic failure of that ambitious enterprise the world has been made acquainted in Craig's belated book.† In our own time we have had a revival of interest in this history-making field through a combination of extraordinary political and commercial events.

The famous quinine industry of eastern Bolivia flourished for many years, but by 1890 it was seriously affected and at last completely undermined by the destructive manner in which the trees were cut and by cheaper production on the plantations of India.‡ Even in its palmy days it paid a heavy tax in transportation. By 1881 cinchona could be gathered only in places almost inaccessible, and the cost of carriage from Bolivia to Europe was no less than

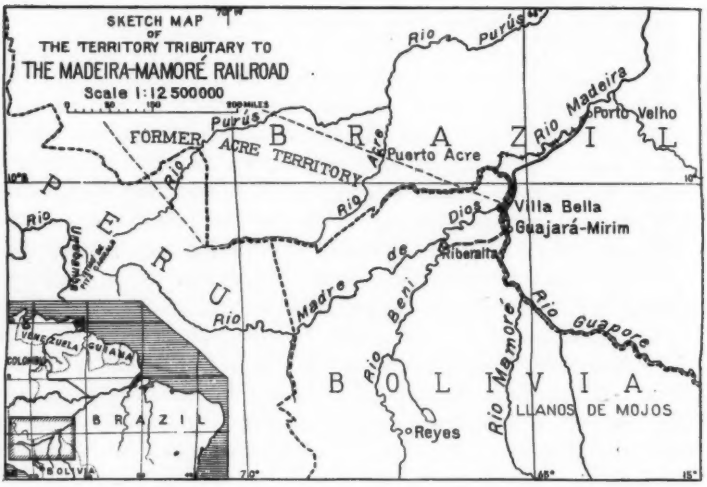
* The Route to Bolivia via the River Amazon. A Report to the Governments of Bolivia and Brazil. 216 pp. Map. Waterlow & Sons, Ltd., London, 1877. The Rapids of the Madeira Branch of the Amazon River. A Preliminary Report upon the Madeira and Mamoré Railway. 1869.

† Recollections of an Ill-Fated Expedition to the Headwaters of the Madeira River in Brazil. By Neville B. Craig. 479 pp. Maps, ills., index. J. B. Lippincott Co., Philadelphia, 1907.

‡ Explorations in the Rubber Districts of Bolivia. By H. Arnous de Rivière. *Bull. Amer. Geogr. Soc.*, Vol. 32, 1900, pp. 432 *et seq.*

$400 per ton.* The planters became discouraged; not even the gold industry thrived. The only industry to which they could turn was rubber. In making this change they were encouraged by events which can be understood only by reference to the most important explorations in the region.

Down to the time of the Jesuit Fathers but little exploration of the great plains and rivers of eastern Bolivia had been attempted, and its resources were therefore but imperfectly known. The monks brought cattle and seed, organized the famous missions in which they gathered their Indian neophytes, and developed the grassy plains of the Mojos country down to the falls of the Madeira. In 1767 they



were driven out by order of the Church, their people scattered, and much even of their knowledge of the geography was lost. The region once more emerged into the light when Lieutenant Gibbon of the American Navy went down the Chaparé, Mamoré, and Madeira in 1852.† Farther north the feeble explorations of Palacio for the Bolivian government did nothing more than disclose the existence of the falls of Esperanza near the mouth of the Beni.‡ He pro-

* Eastern Bolivia and the Gran Chaco. By J. B. Minchin. *Geogr. Journ.*, Vol. 3, 1881, p. 412.

† Exploration of the Valley of the Amazon made under direction of the Navy Dept. By Wm. Lewis Herndon and Lardner Gibbon. Part II. By Lt. Lardner Gibbon. x and 339 pp. Map, ills. House of Repr., 33d Congress, 1st Session, Washington, 1854.

‡ The Basins of the Amaru-Mayu and the Beni. By C. R. Markham. *Proc. Royal Geogr. Soc.*, Vol. 5, 1883, p. 323.

nounced the river impassable and for a third of a century the lower course was unknown and dreaded by the rubber men. Then came the memorable expedition by Heath in 1880. He descended the river and proved that it was navigable except for the rapids near its mouth, that great resources of rubber were untouched, and that the difficulties owing to savage tribes were exaggerated. Upon his return to Reyes near the Mapiri tributary of the Beni, "Bells were rung, houses decorated, a holiday proclaimed . . . Mass was said, and all seemed to consider my work a public benefit . . . Men became crazed over the rubber prospect, and many sold their cattle and lands to go into the business."* Within four months after his return the number of men collecting rubber on the Beni had increased over 300 per cent., or from 185 to 644.

It thus came about that a new industry sprang up in spite of an insufficient labor supply, great distance from the market, and a choice between frightful mountain trails and a river system interrupted by many dangerous rapids. As soon as development began the vast extent and value of the rubber territory became known, and at once each nation was anxious to get the lion's share of the territory. In the struggle Brazil had one great advantage. Though the larger part of the newly discovered rubber forests lay in Bolivia, it was Brazilian labor that developed it. The alti-plano with its dense population could not supply acclimated rubber collectors, whereas the people of the settlements on the middle and lower Amazon, long engaged in tropical agriculture and rubber gathering, immediately responded to the new call. Brazilians by thousands forsook their plantations to paddle into the rubber country for the adventure of gain in a new and promising field.

It is now worth while briefly to review those historical events that grew out of the treaty relations of the neighboring republics. Brazil had long kept the Amazon country closed in the face of repeated protests, but in 1866 opened the main river and the lower portions of a few of the largest tributaries. This called for a "Treaty of Limits, Commerce, and Navigation," signed in March, 1867, to provide for adequate police and customs regulations. Fifteen out of thirty articles were devoted to the river trade between the two countries whose common lowland frontier cuts squarely across the drainage systems. It was stipulated that Bolivia should have the use of any road that might be built to avoid the falls of the Madeira. The first steamer on the Amazon began running about 1852.† The first

* The Exploration of the River Beni. By E. R. Heath. *Journ. Amer. Geogr. Soc.*, 1882, p. 134.
† Exploration of the Valley of the Amazon. Part I. By W. L. Herndon. 1854.

steamers on the Argentine rivers made their appearance in 1856,* and in the late sixties the development of the interior lowlands of South America was under way. In 1872 it became known that there was an abundance of rubber trees in the Purús district, and by 1878 eight thousand settlers (chiefly Brazilian) were established there. In 1899 the province of Ceará, Brazil, subject to periodic drought, was again stricken, and great numbers of its people emigrated to the rubber country. By 1904 the population of the Purús valley alone had increased to 60,000. By 1884 Brazilians greatly exceeded Bolivians in number on the Purús and its tributaries,† and Brazil at once denounced its treaty of 1867, since it was Bolivian perfidy that stifled the railroad project of 1880, to her own harm no less than to the disadvantage of Brazil. In 1890 Bolivia began what proved to be fruitless negotiations for a new commercial treaty, and in 1899 it established a custom-house at what is now Puerto Acre, on the Bolivian side of the frontier as defined in the treaty of 1867. At this remote "Junta de los Rios" there was at last developed bitter hostility among the Brazilians toward the regulations of government, abetted by a curious concession, on the part of Bolivia to an Anglo-American syndicate, of land and political power amounting to practical sovereignty. The large lawless element in so remote a frontier population would have made some trouble under the best possible circumstances, but the trouble was bound to be grave when the population originated in one country and were working under another whose arm was feeble and its territory vast. Events culminated in a revolution and the proclamation of the ill-starred "Republic of Acre" with Louis Galvez as President, July 15, 1899. Troops were sent thither from both Bolivia and Brazil, but when war seemed imminent the trouble was happily averted by a *modus vivendi* signed at La Paz in March, 1903, and finally by the treaty of Petropolis signed in November of the same year.

By the terms of the treaty of Petropolis, 1903, Bolivia secured a few small tracts of Brazilian territory, while the greater part of the disputed tract, or over 70,000 square miles, were ceded to Brazil. In return the latter country paid Bolivia $10,000,000 for the development of commerce and transportation and agreed to construct the Madeira-Mamoré Railroad, with a branch to Villa Bella, Bolivia. There is to be perfect liberty of land and water transportation, and both countries have equal privileges in the use of the completed railroad.

* Report on the National Bolivian Navigation Company, 41st Congress, 2d Session, 1869, p. 49.

† The Acre Territory and the Caoutchouc Region of Southwestern Amazonia. By G. E. Church, *Geogr. Journ.*, Vol. 23, 1904, p. 598.

For the past half century eastern Bolivia has been slowly awakening from an age-long sleep. Had it produced no commodity so precious as rubber it is doubtful if that sleep would have been yet disturbed. The heart-breaking task of conveying goods several months up river against the current and thence by mule-back up atrocious mountain trails to the snow-line is only a little more arduous than the two months' task of hauling *batelãos* on rollers and transporting the rubber cargo on the backs of human carriers around the many rapids in the two hundred mile stretch between Guajará-Mirim and San Antonio (now Porto Velho). The only other outlet, that over the divide toward Santa Cruz, was equally difficult since a long carry had to be made to get to Santa Cruz where a six weeks' ox-cart journey and fifteen hundred miles of river navigation were still required to reach the sea. Even rubber was at last unequal to the task. The competition of eastern rubber (India and the East Indies) steadily reduced the profits. Furthermore, labor is so expensive in this singularly laborless region that transportation costs actually rose as operations were extended. The railroad became a fundamental condition in the further successful conduct of the rubber business.

Heretofore a few launches have plied on the streams above the falls but the expenses for fuel, transportation of parts, and skilled labor were almost prohibitive. The railroad will make possible a great launch service already in process of development. Power boats of shallow draft can go almost to the foot of the mountains during the wet season. Time was when six feet was considered navigable depth, but three is now regarded practicable. The British gunboat *Widgeon,* 160 feet long, has a draft of only two feet, six inches, which prompts a paragrapher to remark that we are now running a close second to the celebrated western steamboat that could travel on dry land provided a man was sent ahead with a watering-pot. The chief difficulty in extending the launch service is the variable depth of the water. At the falls the difference between high and low water is forty-five feet. However, it is distinctly less on the tributaries near the mountains, and since rubber is a durable crop it can wait for high water, so that practically the whole of the plains country tributary to the Madeira above the falls can be reached by launch. When the railroad to Riberalta (on the Beni above the last falls, sixty-two miles from Guajará-Mirim) shall have been completed it will practically double the accessible area, since the Madre de Dios and its tributaries will also have an outlet.*

* Nuevas exploraciones en la hoya del Madre de Dios, Publicación de la Junta de Vias Fluviales, Lima, 1905. Ultimas exploraciones ordenadas por la Junta de Vias Fluviales a los rios Ucayali, Madre de Dios, Paucartambo y Urubamba. By Stiglich, von Hassel, Olivera, and Ontenada. Lima, 1907.

This great fluvial system crosses a plain that extends up to the base of the mountains. Low divides separate its northerly headwaters from the Mishagua, Camisea and other tributaries of the Urubamba at the famous "Istmo de Fitz-Carrald."* Over this divide might eventually come some of the mountain products, just as when the Acre trouble was at its height some of the Madre de Dios products were taken west and north to the Urubamba and down the Ucayali.†

The possibilities of the region that the railroad and the launches now serve are not limited to rubber, abundant and excellent as the Bolivian product has proved to be. Here are also extensive grass lands, reaching down nearly to the falls, and from Reyes, in the Beni valley near the mountains, eastward beyond the Mamoré. They are the northward prolongation of the grass lands of the Chaco, though here more frequently interrupted by forest tracts. In the palmy days of the Jesuit missions these pastures supported immense herds of cattle,‡ and the happy conditions of the past can be restored. Hides, tallow, and meat products can be produced in great quantities. The shallow basin drained by the Beni, the Mamoré and their tributaries, variously called the Madeira *Plate*§ or the Mojos depression,¶ is subject to overflow in the wet season, but "islands" of elevated land are scattered about where game, stock, and man himself may seek refuge. The inundations favor the growth of the rubber trees and are not wholly detrimental to the grasses of the prairies. Chocolate, vanilla, sugar, hardwoods, and dyewoods are additional products. The easternmost and now remote valleys of the Cordillera on the border of the plains add coca, coffee, and many other products to the list. For we are not now speaking of the typical wet forest of the Amazonian lowlands but of the transition type of forest which grows in the one-wet, one-dry season climate of the upper Madeira basin and of the tracts of grass land interspersed through it in the south, as well as the true grass lands of the middle Mamoré.

The Madeira Railroad* is 202 miles long, has a meter gauge, and a maximum grade of 2 per cent. Construction work began in August, 1907, and the line was completed in July, 1912. The ties

* Recent Discoveries in the Basin of the River Madre de Dios (Bolivia and Peru). By C. R. Markham. *Geogr. Journ.*, Vol. 7, 1896, p. 189. (Deals with first exploration of the route by Fitz-Carrald and others.)

† The Acre Territory and the Caoutchouc Region of Southwestern Amazonia. By G. E. Church. *Geogr. Journ.*, Vol. 23, 1904, p. 598.

‡ The Amazon and Madeira Rivers. By F. Keller. 1874, pp. 145, 153, *et al.*

§ Gibbon, *op. cit.* ‖ Church, Keller, and others.

¶ For maps of the region see *Bull. Amer. Geogr. Soc.*, Vol. 36, 1904 (facing p. 256), and *Petermanns Mitteilungen*, Vol. 52, 1906, Plate 16.

were imported from Australia—and more cheaply than they could be hewed from the resistant tropical woods close at hand. Trains now run regularly from the terminal stations three times a week and take two days to cover the distance. The maximum speed allowed is from 15 to 20 miles an hour. There is wireless connection with Manaos, 500 miles away straight through the forest, and an ice plant and a water system have been in use for some time. More than twenty-five thousand workmen have been employed since work was begun. The mortality among them dropped from 125 per thousand in 1909 to 70 per thousand in 1912.*

Thus in the heart of a river system long closed by imperial edict we have a railroad, a wireless service, a telegraph line, steam launches, a pier for ocean-going steamships, and a great commercial future. The mystery of the Amazon basin diminishes. The recent difficulty between Brazil and Bolivia only serves to emphasize the real reason for the long-delayed development. The irritating exclusiveness of Brazil was not due to the acceptance by old Dom Pedro of medieval standards, as many have supposed, but to a desire to avoid costly boundary disputes and the burden of policing a vast territory long so inaccessible except by "the flowing road" as to make by-words of law and order.

* Valley of the River Amazon—the Madeira-Mamoré Railway Co. By Albert Hale. *Bull. Pan-Amer. Union*, Dec., 1912, pp. 1116–1141. For descriptive articles on the history and construction of the Madeira-Mamoré Railroad, see *idem*, Jan., 1910; March, 1911; and Nov., 1911.

SOIL FLOW

The Berlin Geographical Society has done wisely in preparing this symposium* upon the subject of soil flow, which has only recently come prominently to the notice of geologists and geographers. The various processes to which the name soil flow (*solifluction* of Andersson) has been applied, would appear to be characteristic of sub-polar lands where the surface of the ground is in part snow covered and soaked with thaw water for a considerable season, as well as in those higher lying areas of lower latitudes within which essentially the same conditions prevail. This symposium has come about directly as a result of the International Geological Congress of 1910, which for the first time brought together a large body of geologists in a sub-polar region; though it should be

* A. Miethe, Ueber Karreebodenformen auf Spitzbergen; A. Penck, Ueber Polygonboden in Spitzbergen; H. Spethmann, Ueber Bodenbewegungen auf Island; G. Braun, Ueber Bodenbewegungen in Mittel und Südeuropa; Wilh. Meinardus, Beobachtungen über Detritussortierung und Strukturboden auf Spitzbergen; K. Sapper, Ueber Fliesserde und Strukturboden auf Spitzbergen: *Zeitschr. der Gesell. für Erdkunde zu Berlin*, 1912, No. 4, pp. 241–270, 2 pls.

pointed out that Swedish geologists and botanists had already given much attention to the subject, with which the names of Andersson, Nordenskiöld, and Högbom are especially associated.

Of the several contributors to the discussion, Professor Penck devotes his attention to the more common polygonal structures generally referred to under the name *Karreeboden*, which may perhaps be best rendered in English by barrow ground, the round form of dirt barrow supplying the illustration. Such structures are always found on flat areas, the surface being divided up into contiguous polygonal patches from one to two yards in diameter, marked out by zones of rock fragments often set on edge like the flat stones in a gutter pavement. A variation is, however, supplied by the absence of rock fragments, their place being taken by a raised ridge (bolster) of vegetation.

Though the geologists on the excursion were not of one mind concerning the origin of these structures, the discussion developed a unanimity in so far as to regard them as in all cases connected with the alternate freezing and thawing of surface layers of the ground more or less thoroughly saturated with water.

Thawing implies a contraction, and except for the larger areas of the resulting polygons this may be compared with the repeating polygons which are produced by the desiccation of mud. The expulsion from the interiors of the polygons of the enclosed rock fragments and their erection on edge within the marginal fissure involve processes less easily explained. Penck's view is that the clay ground mass of the material sucks in the water, which by freezing develops a pressure that forces the fragments to the surface, where a subsequent refreezing lifts them on low ice pedestals of the slightly domed surface of the polygon. From these positions they eventually slide off radially into the marginal fissure. In case such fragments are not included in the local terrain, the marginal fissure offers a foothold for the scant sub-arctic vegetation and a raised bolster ring is the result. The reviewer would suggest that the as yet little accounted but important wind-borne sand and dust of the sub-polar regions may play a large rôle in this latter process.

It is a much less common structure connected with soil flow which is discussed by Miethe, but one that is developed in remarkable perfection in Spitzbergen, close to the water's edge. On the gentle incline outside an abandoned shore line the structure appears at the surface as circular on slightly elliptical wreaths of rock fragements either alone, grouped, or closely crowded together, the diameter of the rings being generally some six to eight feet and the thickness perhaps a fifth of this amount. The rock fragments of the rings or wreaths average the size of the fist, whereas the area within is clay nearly free from stones and slightly domed. The rock wreaths, which usually project a foot or more above the general surface, were found by digging to descend some two feet or more into the tundra soil, and below this depth as well as without the wreaths, the rock fragments are distributed with uniformity throughout the clay. It was perhaps significant that the base of the structure was a particularly moist clay layer. Upon the surface the interiors and the margins of the wreaths are moss-grown.

Miethe's explanation of these structures assumes that when the snow is melting the otherwise frozen ground becomes thawed to the depth of the later developed structures, and the stream of ground water flowing under pressure in

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the direction of the slope utilizes the frost cracks to rise loaded with mud to the surface where it overflows into the central area. The rock fragments are moved to the cracks but, as they do not rise, remain there, and as the interior areas settle down they are left in relief. An inner margin of mud within the stone crowns, was in some cases observed.

Meinardus after treating the common Karreeboden discusses further the stone wreaths which formed the subject of Miethe's studies, taking exception to the latter's explanation on the ground that the assumed stream of ground water which gives rise to the mud exudations at the surface cannot exist. He claims that at the depth of a half meter only, the ground temperature is late in June below o°C, though the supply of thaw water which must nourish the stream is then largely exhausted. In the main, his contribution to the discussion consists of a long and labored analysis and classification of the processes and elementary structures supposed to be involved in soil flow, which adds little to our knowledge of the subject but tends rather toward a confusion of ideas.

Spethmann discusses Icelandic variations of the process, three of which are of special interest. What he has designated "earth-rents" (*Erdreissen*), occur on flat areas and are cracks of a finger's breadth and a few centimeters depth which in either straight or but slightly curving courses run for many hundred yards without observable order, often intersecting to produce irregular polygons with average diameter of fifty to one hundred yards. Such cracks were once actually observed by Spethmann in process of formation during the night when the temperature was —2°C. Of slope effects of soil flow he describes mountains surrounded at the base by a ring or collar so as strongly to resemble volcanoes enclosed in "Somma" rings.

Another phenomenon is connected with plant colonies, which the Swedish geologists have long realized play a large rôle in soil flow. On some slopes the vegetal cover is scattered in patches ordered in lines so that differential soil flow yields hundreds of low hillocks known as "Thufa" to the Icelandic farmers. Such mounds constituting a serious hindrance to cultivation, they are often leveled by the farmers only to return after a few years.

Without special success, Braun has sought to correlate closely the well-known "creep" characteristic of soil in moderate latitudes and low altitudes and the catastrophic avalanches or "frane," with the special manifestations of soil flow in sub-polar regions. As Lozinski has shown, the rock streams in the Taunus quartzite and the "Felsenmeere" of the Odenwald should probably be referred to processes operating during the glacial period when conditions in Central Europe more resembled those of the sub-Arctic to-day.

From studies in Spitzbergen Sapper describes in some detail, and offers explanations for, the contrasted main types of *polygonal* or *Karreeboden* (which occur on flat areas and are unconnected with migrational movements of the soil) and the land migrations which occur on slopes due to the force of gravity acting upon the mass in cooperation with other forces. These contrasted structures which were first clearly differentiated by Nordenskiöld, Sapper proposes to distinguish as *Strukturboden* (Meinardus's term) and *Fliesserdeerscheinungen.* One may well differ with him as to the aptness of these distinctions, since the former term might properly be applied to the latter class of phenomena. "Polygonal ground" or "barrow ground" already in use is certainly preferable.

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In connection with downward migration of the soil upon slopes, Sapper lays stress upon the favoring elements of absence of vegetation and presence of glaciers or snow masses to supply the saturating thaw water in regions of small rainfall. He dissents, however, from Nordenskiöld's view that the snow or ice is essential, citing their absence (at the time of his visit in late summer) in certain examples. To him we are indebted for some careful measurements of the dimensions of the structures and of the angles of slope in which they are found. He mentions the occurrence of small mud streams which display fluidal structure in concentric wrinkles parallel to their margins, also short streams one above the other, extending step fashion down the slopes. The reviewer would call attention to a further variation observed by him in Swedish Lapland, which the Swedish geologists report to be not uncommon. Local nucleii of soil movement on slopes produce circular platforms, a few feet in diameter in part within and partly without small niches in the slope, and in shape resembling nothing so much as the platforms for charcoal burning which are common on slopes of the Green Mountains of New England.

The "Thufa" which Spethmann described from Iceland, Sapper found in a few examples in Spitzbergen, which he described as "frost hillocks." In common with most other observers, Sapper sees in the processes which give rise to *Strukturboden* alternate freezing and thawing of the saturated ground, a belief which he has expressed in the term *Regelationsfliesserde.* Other names either quoted from others or suggested for the same structures are "flower beds" *(Blumenbeete),* "round beds" *(Rundbeete),* and "debris facets" *(Schuttfacetten),* as well as "little stone gardens" (*Steingärtchen*) long in use for similar structures found in the Alps. That the formation of these polygons in the soil is connected with a supersaturation with thaw water seemed clear from observations made near Advent Bay, where they are found below a snow drift. Here one sank deep in the mud, and the water circulated beneath the stone wreaths. A centrifugally directed pressure Sapper believes to exist within the polygons, because the clay in the centers contains more water than the more heterogeneous material outside. This inner cylinder of clay by freezing expands, expelling the marginal rocks toward the fissure and, as space becomes insufficient for the full dilatation, arches up at the center. With subsequent thawing the mass subsides, thus leaving the marginal rock rim in relief. The always frozen base of the structure plays the important rôle of retaining the thaw water within the surface layers of the ground.

The few illustrations are from photographs and are excellent, and the contributions together make a valuable addition to our knowledge of the subject. The subject is, however, a large one and the structures described are by no means all that have been observed.

WILLIAM HERBERT HOBBS.

GEOGRAPHICAL RECORD

THE AMERICAN GEOGRAPHICAL SOCIETY

EXHIBITIONS BY THE AMERICAN GEOGRAPHICAL SOCIETY AND THE HISPANIC SOCIETY OF AMERICA. On Feb. 9, these Societies opened, in their respective houses, a series of exhibitions illustrating the geography and development of the South American Republics. In the first exhibition our Society showed, on tables and racks, atlases and maps illustrating Chile at various periods. The display of these maps was especially instructive because it showed the different stages of our knowledge of the country and of the distribution of its resources, and the gradual improvement in the efficiency of the map symbolism employed to present a large variety of information. At the same time the Hispanic Society of America had on exhibition a collection of admirable photographs of cities and of many other aspects of Chile.

The simultaneous exhibitions by the two Societies have been continued since then. Maps, atlases and photographs of Mexico were displayed for two weeks beginning on Feb. 16, and the Argentine, Peru and Brazil exhibitions were open for a week each, beginning March 2, March 9 and March 16. The attendance at both Societies has been large. The number of visitors to the exhibition rooms of our Society was 3,261 up to March 16, and much interest has been shown. The exhibitions are open from 10 to 5 o'clock on week days; on Sunday, from 1 to 5 P.M. at the Hispanic Society's house, and from 2 to 5 P.M. at the house of the American Geographical Society.

Some of the more important maps exhibited were:

Mexico: Early maps of the North American continent showing progress of discovery; Humboldt's compilation of 1812, incorporated with the Atlas of New Spain (this map was used as the base of later compilations up to 1860); a large number of sheets of the 1:100,000 map of Mexico published by the Comisión Geográfica Exploradora.

Brazil: General map of Brazil, 1:5,000,000, compiled by the Ministry of Industry and Public Works on the occasion of the National Exhibition of 1908; several state maps and many sheets of the 1:100,000 topographic map of São Paulo.

Argentine: Seelstrano y Tourmente's map, 1:4,000,000, issued in 1875 on the occasion of the World's Fair at Philadelphia; the 1:200,000 cadastral map of the province of Corrientes.

Peru: Raimondi's 1:500,000 map and a scarce manuscript compilation by the same cartographer.

Chile: The sheets of the 1:500,000 map of Chile issued by the Oficina de Mensura de Tierras; also the 1:250,000 sheets of the Argentine and Chilean boundary issued by the Oficina de Limites.

A large number of railroad and economic maps were shown.

MEETING OF THE SOCIETY. A special inter-monthly meeting of the Society was held in the Engineering Societies' Building, No. 29 W. 39th St., on Tuesday, March 11, 1913, at 8.30 P.M. Vice-President Greenough in the chair.

Mr. Greenough introduced the speaker of the evening, Miss Ellen Churchill Semple who addressed a large audience on "Geographic Influences in Japan." Superior stereopticon views illustrated many phases of Miss Semple's able exposition of the large part that geographical environment plays in shaping the life and activities of the Japanese people.

NORTH AMERICA

FROST PROTECTION IN THE UNITED STATES. The question of frost fighting is receiving an increasing amount of attention in the United States for the reason

that frost is likely to do more damage as the area devoted to fruit-growing and to raising other valuable crops is increasing. There are several recent publications which deal with frost protection. Mr. J. C. Alter, of the United States Weather Bureau at Salt Lake City, has made a detailed investigation of the cost of frost fighting in Utah in a discussion of the question, "Does Frost Fighting pay in Utah"? (*Mo. Wea. Rev.*, Vol. 40, 1912, pp. 606-608). Taking into account the cost of labor, fuel, equipment, etc., the following table has been prepared, showing the cost of protection by smudging per acre at the different temperatures given:—

29° - 30°, $0.60; 28° to 30°, $1.00; 27° to 30°, $1.40; 26° to 30°, $1.80; 25° to 30°, $2.20; 24° to 30°, $2.60; 23° to 30°, $3.00; 22° to 30°, $3.40; 21° to 30°, $3.80; 20° to 30°, $4.20. In other words, for each degree of temperature-fall the cost increases 40 cents per acre.

Irrigation and Alkali in the United States. Irrigation has turned thousands of acres of "desert" in the western United States into green fields and orchards. The success which has been attained by farmers and fruit-growers in these reclaimed sections has been so phenomenal that unduly optimistic views regarding the future of the irrigated lands are naturally held by many people. There are many things which ought to be borne in mind. Years of decreased rainfall will surely follow the favorable years which so much of our western country has been enjoying. Then there will be less water available for irrigation. New and unforeseen difficulties have arisen where irrigation is practiced. Weeds, growing abundantly along the canals, drop their seeds into the water, and these seeds are distributed over the orchard or the field. And one of the greatest problems concerns the accumulation of an excess of alkaline salts in the surface soil. This is becoming a very serious difficulty in many sections, and demands immediate and careful attention.

The subject of the alkali in the soils of irrigated areas is clearly and briefly considered by Mr. R. A. Hart, United States Drainage Engineer, in a recent article on "The Relation between Light Precipitation and Alkali" (*Mo. Wea. Rev.*, July, 1912, pp. 1099-1100). The essential facts are these: In the so-called arid regions the precipitation is generally sufficient to leach out the salts in the immediate surface and to carry them down, by percolation, far enough to allow sage-brush, wild grasses, etc., to thrive to a limited extent. Evaporation being excessive, the ground-water table is usually found at a great depth. Now, in irrigation, much more water is used than is really needed. A portion of the excess is lost by evaporation and by surface waste. The remainder moves down through the soil by percolation. This movement leaches out the alkaline salts from the root zone of the soil, and make agriculture possible. But the percolating excess actually fills up the ground-water reservoir, and the water table rises in consequence. In this upward movement of the water table, the concentrated alkaline solution near the upper limit of soil saturation (above the free water level) precedes the water table by a few feet. Therefore, when the ground-water table reaches a plane within the capillary distance of the ground surface, evaporation of this concentrated solution deposits the salts at or near the surface, causing the death of plants. The remedy is to lower the ground-water table to such a depth that capillary action cannot raise water and alkali salts near enough the surface to do damage, and to repeat the original process of leaching out the alkaline salts by using an excess of irrigation water. After that, a "sane" amount of irrigation water should be used. Good underdrainage is the cure for this difficulty.

It is worth noting, in connection with Mr. Hart's paper, that in the Salt River valley of Arizona, irrigated by means of the Roosevelt Dam project, electric power developed at the dam is utilized in the valley for the purpose of reducing the ground-water level by pumping. R. DeC. Ward.

Agriculture in Alaska. The Bureau of the Census has issued a bulletin containing the agricultural statistics for the territory. In 1910 the number of farms was 222, a farm being defined, for census purposes, as a tract of three or more acres used for agricultural purposes, or any tract of less than three acres producing at least $250 worth of farm products in 1909. The improved land in farms amounted to 2,660 acres. On the farms were 811 cattle, 206 horses, 165 hogs, 184 sheep, 16,566 reindeer, 162 work dogs, and 5,483 chickens. An

important number of domestic animals were also kept on lands not counted as farms. The amount of milk reported for 1909 was 66,386 gallons and the amount of milk and cream sold was 42,282 gallons valued at $34,063. The number of eggs produced was 17,100 dozens valued at $29,854. Vegetables were by far the most important crop in 1909. Their total value aggregated $186,134. The hay and forage crop was valued at $94,933. Potatoes were produced to the amount of 10,903 bushels.

ASIA

REMAINS IN EASTERN ASIA OF THE RACE THAT PEOPLED AMERICA. Under this title Dr. A. Hrdlička of the U. S. National Museum reports the results of his visit in 1912 to parts of Siberia and Mongolia in search for possible remains of the race that peopled America (*Smithson. Miscell. Coll.*, Vol. 60, 1912, No. 16, pp. 1-5). His studies were restricted to parts of southeastern Siberia and northern Mongolia as far as Urga. Visits were also made to Siberian museums within the area covered for the purpose of seeing their anthropological collections. He saw or had information of thousands of barely touched burial mounds or "kourgans" dating from the present time back to the period when only stone implements were used by man in those regions. The little investigation that has been made of these remains is due chiefly to Adrianov and his colleagues at Minusinsk and especially to Professor Talko-Hryncewitz of Crakow. The mounds yield, according to their age, implements of iron, copper, bronze or stone, occasionally some gold ornaments and skeletons. The majority of these "kourgans" date doubtless from fairly recent times, corresponding to Ugrian or Turk or "Tatar" elements and to the modern Mongolian, and the skeletons found in them show mostly brachycephalic skulls, some of which resemble quite closely American crania of the same form. The older "kourgans" on the other hand particularly those in which no metal occurs yield an increasing number of dolichocephalic crania, in which close resemblances with the dolichocephalic skulls of the American Indians are very frequent. To what people these older remains belong is as yet an unanswered question; but in some localities as on the lower Yenisei there are to-day remnants of native populations among whom dolichocephalic individuals are quite common, and they often bear a most remarkable physical resemblance to the American Indian.

Dr. Hrdlička also saw many Buriats, representatives of tribes on the Yenisei and Abacan Rivers, many thousands of Mongolians as well as Tibetans, Chinese and Manchurians. Among all these people, but especially among the Yenisei Ostiaks, the Abacan Katchinci and related groups, the Selenga Buriats, the eastern Mongolians, the Tibetans, the east Siberian Oroczi and the Sachalin Giliaks there are many unmistakable traces of admixture or persistence of what appears to have been the only population of these regions. They resemble to the point of identity American Indians of corresponding head form, they are brown in color, have straight black hair, dark brown eyes and facial as well as bodily features which remind one forcibly of the native Americans.

Dr. Hrdlička found more evidence in this direction than he had hoped for. He says the physical resemblances cannot be regarded as accidental. "The writer feels justified in advancing the opinion that there exist to-day over large parts of eastern Siberia, and in Mongolia, Tibet, and other regions in that part of the world, numerous remains, which now form constituent parts of more modern tribes or nations, of a more ancient population (related in origin perhaps with the latest paleolithic European), which was physically identical with and in all probability gave rise to the American Indian." He has satisfied himself that the field for anthropological and archæological research in eastern Asia is vast, rich, to a large extent still virginal, and probably not excessively complicated.

INDIAN RAINFALL. With the extension of irrigation works and of various commercial undertakings which depend upon rainfall in India, the demand for reliable information regarding the maximum amount of rain to be expected within short periods has been increasing. To meet this natural and legitimate demand, the Indian Meteorological Department has issued a *Memoir* (Vol. XXI., Pt. II, of the *Memoirs of the Indian Meteorological Department*), prepared by

Dr. Gilbert T. Walker, the Director-General of Indian Observatories, in which all the available data are concisely summarized. The information is divided into two parts. The first part concerns heavy rainfalls extending over a day or more, and contains, in chronological order, the data of all daily falls of rain exceeding 10 inches in each of the chief political divisions into which India was divided during the closing years of the period covered, *viz.*, 1891-1911. The available records, collected from fragmentary sources previous to 1891, are also included. A fact of importance, usually neglected, is the question whether a heavy fall of rain was preceded or followed by heavy rainfall. Dr. Walker has wisely included such data in his tables. The second part includes data concerning bursts of heavy rains lasting not longer than a few hours. The whole matter of Indian rainfall is unusually interesting, and the present discussion adds greatly to our available information on this subject. R. DEC. WARD.

POLAR

STEFÀNSSON'S NEXT EXPEDITION. In February, the Canadian Government made an offer to Mr. Stefànsson to assume the responsibility of providing all the funds needed for his next Arctic expedition, the whole enterprise to be a governmental matter. The government of Canada assumed the position that as Stefànsson's work was to be carried out in Arctic areas claimed by the Canadian Government it was more suitable that the expedition should sail under the flag of that country.

The American Museum of Natural History and the National Geographic Society had already agreed to give liberal support to Mr. Stefànsson's further work, but they yielded the rights they had acquired in his enterprise, and the expedition will go north entirely under the auspices of Canada. Mr. Stefànsson's plans have not been materially changed by the fact that the Dominion of Canada will be the financial supporter of his work.

The American Museum Journal (Vol. 13, 1913, No. 2, pp. 55-56) gives an outline of the explorer's intentions. The chief aim of the expedition will be geographical and anthropological exploration. As planned, the expedition will have two main bases, the northern one on Prince Patrick Island and the southern on the mainland of North America near Coronation Gulf. Mr. Stefànsson will give personal attention to geographical exploration and the study of the Eskimo. Dr. Anderson will conduct the biological investigations. It is expected that a staff of at least six scientists will accompany Mr. Stefànsson, Dr. Anderson being one of the number.

In general, the plan is to spend three or four years in an intensive study of the archæology and ethnology of the Eskimo, together with the zoology and geology of the whole region from Alaska to Coronation Gulf; also, to map the unexplored coasts of Victoria and Prince Patrick Islands and by off-shore journeys to the north and east determine by means of soundings the extent of the continental shelf and discover new lands, if such there be. It is intended that the expedition shall be a scientific one and devote its energies to the investigation of this unknown region.

The anthropological work is to be made a special feature, the main problem here being to determine the present and former limits of human occupation. During summer the surface will be searched for traces of former villages which, when found, will be carefully studied by excavation and otherwise to determine their relative ages and the cultural character of their occupants. Such archæological work is now needed to estimate the period of occupation and the direction of Eskimo migration.

In the east, special attention will be given to the distribution of the peculiar hybrid Eskimo discovered on the last expedition. It is intended that a full census of the people be made, noting the somatic character of each to serve as a basis for the study of this peculiar biological problem.

ICEBREAKERS STOPPED BY ICE AT THE TAIMYR PENINSULA. Two Russian icebreakers, the *Taimyr* and the *Vaigach* left Petropavlovsk, the Russian Bering Sea port in southern Kamtchatka, passed Cape Deshnef, the most eastern point of Asia, July 22 and pushed westward along the north coast of the continent. They reached the mouth of the Lena River on Aug. 25, taking soundings and making surveys of the North Siberian coast on the way. Depths of about fifteen

feet were found in the Lena Delta. The vessels went on westward intending, if possible, to steam along the coasts of the Taimyr Peninsula, the most northern region of Asia, but they were finally stopped by impassable ice. They found the coast waters shallow, the temperature fell to minus 9° C and though the attempt to proceed was renewed on Sept. 6 it was impossible to advance beyond 76° N. The vessels therefore turned east again and reached Petropavlovsk safely on Oct. 1. (*Pet. Mitt.*, Band 58, 1912, Dec.-Heft, p. 348).

Disaster Overtakes Lieut. Schröder-Stranz's Arctic Expedition. This expedition went to Spitzbergen last year to acquire some Arctic experience before entering upon its more serious purpose of making the Northeast Passage. Its leader expected to return in the fall but the Arctic winter set in earlier than usual and he was unable to return south. *Petermanns Mitteilungen* (Nov., 1912, p. 285) reports that early in January the Norwegian station in Spitzbergen sent a wireless message to Christiania saying that the expediton had been most unfortunate. Captain Ripschel, who commanded the little vessel *Herzog Ernst* that took Lieut. Schröder-Stranz's party north, arrived on foot at Advent Bay on the west side of Spitzbergen on Dec. 27, in a miserable condition. He said he had left the oceanographer Dr. Rüdiger at Wijde Bay and three others at Cape Petermann, exhausted with cold and hunger. The *Herzog Ernst* was frozen in at Treurenburg Bay but can probably be taken out next summer. Lieut. Schröder-Stranz had left the ship on a sledging expedition in August and had not since been heard from. There is some hope that his party may have reached the station at Cross Bay. If he did not, his position was certainly precarious for his supplies were very inadequate and an outbreak of scurvy was reported. A relief party started from Advent Bay upon Captain Ripschel's arrival there.

PHYSICAL GEOGRAPHY

Magnetic Survey Work of the Department of Terrestrial Magnetism in 1912. The report of the field work of the Department during the fiscal year Nov. 1, 1911-Oct. 31, 1912 appears in abstract in the *Year Book* of the Carnegie Institution of Washington, 1912, pp. 214-215. At the end of October, 1911, the *Carnegie* had completed her circumnavigation cruise as far as Batavia, Java. She sailed on Nov. 21, 1911 for the eastern Indian Ocean and thence to Manila, where she arrived on Feb. 3, 1912. The total distance covered on this leg of the cruise was 8,292 miles. The cruise continued from Manila to Suva, Fiji; thence to Papeete, Tahiti, and Coronel, Chile, where the *Carnegie* arrived on Nov. 24, 1912. The circumnavigation cruise will be completed by the end of 1913. The total distance covered during the period indicated was about 28,000 nautical miles. The magnetic declination was determined at 260 points and the magnetic dip and intensity at 180 points. The *Carnegie* left Talcuhuano, Chile, on Dec. 18, and arrived at Stanley, Falkland Islands, on Jan. 27, 1913, having had a good passage in rounding the Horn.

The errors in the charts of the lines of equal magnetic declination used by mariners in the eastern part of the Indian Ocean reached nearly the same magnitude as those found in the western part of this ocean, *viz.*, 3°to 5°, according to the chart used. The chart errors in magnetic declination in the China Sea and in the Pacific between Manila and Suva were, however, usually less than 1°. Between Suva and Tahiti the chart errors amounted to nearly 2°. The maximum errors in the charts of the lines of equal magnetic inclination and of equal horizontal intensity were as follows: Eastern part of the Indian Ocean, 3.5° in magnetic dip, and one-thirtieth part in the horizontal intensity; in the China Sea 1.5° in magnetic dip, and one-fortieth part in horizontal intensity; in the Pacific Ocean between Manila and Suva, 3.5° in dip and one-fourteenth part in horizontal intensity, and between Suva and Tahiti, nearly 8° in magnetic dip for one of the charts and about one-thirtieth part in horizontal intensity. The chart errors appear to be largely due to imperfect knowledge of the corrections to be applied if past observations are to be brought up to date.

The land work during the period was chiefly in Africa, Asia, Australia and South America. The chief expeditions were by Dr. C. K. Edmunds in southern China, French Indo-China and Siam; by Mr. E. Kidson in western and central Australia including an overland trip 1,100 miles by caravan from Oodnadatta

in South Australia to Pine Creek, thence by rail to Port Darwin on the north coast of Australia; by W. H. Sligh in Tripoli, Tunis, Algeria and Morocco and from the Canary Islands by small boat along the coast of Rio de Oro and Mauretania to St. Louis, Senegal; by D. W. Berky in Morocco, Sierra Leone and French Guinea (on October 29, a Trans-Saharan Expedition led by Berky accompanied by H. E. Sawyer left Biskra, Algeria, for Timbuktu); by J. P. Ault's party in Peru, Bolivia and Chile. A series of stations has now been completed across South America from Para at the mouth of the Amazon to the Pacific at Callao, Peru, via the Amazon and Ucayali Rivers and Lima. The three magnetic elements were determined during the fiscal year at 235 land stations.

PERSONAL

ROLLIN T. CHAMBERLIN. Dr. Rollin T. Chamberlin of the University of Chicago recently lectured on his visit to Brazil, before the Geographical Society of that city.

N. H. DARTON. This well-known geologist of the Bureau of Mines, Washington, recently gave two lectures on applied geology to the advanced geological students at Columbia University. His topics were "Construction of Structure Maps of Coal Basins" and "Construction of Maps Showing Artesian Water Conditions."

V. STEFÀNSSON. Mr. Stefànsson sailed for Europe in March to lecture before the Royal Geographical Society and to attend the meeting of the Tenth International Geographical Congress at Rome.

OBITUARY

BENJAMIN LEIGH SMITH. This explorer, noted for his work in Franz Josef Land, died in Hamstead, England, on Jan. 4. He was the first to land in the archipelago after the Austrian expedition under Payer and Weyprecht discovered it in 1873. In 1879, De Buyne sighted high land in the Franz Josef Land region but otherwise it remained untouched until Leigh Smith in his yacht *Eira* explored the whole southern coast from 42° to 54° E. in 1881 and 1882, discovering many islands and sounds and ascertaining that the coast of Alexandra Land in the extreme west trended to the northwest and north. His enterprises were wholly at his own expense and were fruitful in geographical results.

CORRESPONDENCE

THE HEIGHT OF TERAM KANGRI

TO THE EDITOR OF THE BULLETIN. *Sir:* In the *Bulletin* of the American Geographical Society, Dec. 1912, in my notes of the Siachen Glacier (p. 900), there is a foot-note saying that the Indian Survey gives the height of Teram Kangri as 27,610 feet. This is not correct. In 1909 Dr. T. G. Longstaff measured by clinometer a peak which he supposed to be the highest of the group as 27,610 feet. In 1911 the Indian Survey triangulated from four stations another summit of the group which is the actual highest one, with result for altitude of 24,489 feet. In 1912 my topographer, C. Grant Peterkin, triangulated the same peak and the result was 24,510 feet. On my map the height of Teram Kangri will be placed at 24,510 feet as Mr. Peterkin, being in the immediate vicinity, had every chance for an accurate triangulation. Teram Kangri is not the highest peak on the Siachen Glacier, there being three higher ones as you will see by my new map when published.

FANNY BULLOCK WORKMAN,
Bombay, Feb. 18, 1913.

GEOGRAPHICAL LITERATURE AND MAPS

(INCLUDING ACCESSIONS TO THE LIBRARY)

BOOK REVIEWS AND NOTICES

(The size of books is given in inches to the nearest half inch.)

NORTH AMERICA

Annual Report of the Mississippi River Commission for the Fiscal Year ending June 30, 1912. Being Appendix MMM of the Report of the Chief of Engineers, U. S. Army, 1912. House of Representatives, Document No. 936, 62d Congress, 3d Session, pages 3695–3988. 51 plates, 23 full-page illustrations, index. Government Printing Office, Washington, 1912.

The interest centers largely in the official statements concerning the flood of 1912. The general nature and conditions of this flood have been reported in the *Bulletin* (Vol. 44, Sept. 1912, pp. 645-657) but interesting subsidiary items are found in the *Report.*

1. On pages 3714-5, is a table which shows the gauge heights at Cairo and the corresponding gauge heights at representative stations above Cairo for 1912 and for the previous great floods. While the gauge height at Cairo, 53.95 feet, for 1912 was the highest ever reported, the gauge heights at St. Louis on the Mississippi River, at Paducah and Cincinnati on the Ohio, at Florence on the Tennessee and at Nashville on the Cumberland fell considerably short in every instance of the maxima previous to 1912. From which the Commission concludes that "it seems obvious that reservoirs at the tributary head waters would not have been effective in preventing the flood in the Mississippi River below Cairo."

2. The Commission discusses again the persistent belief that floods are caused by the elevation of the river bed due to the construction of levees (page 3715), and reiterates its conclusion that there has been no progressive elevation of the river bed. In this connection, the findings of earlier investigators concerning the Po and the Rhine, which are currently reported as having built their beds high above the surrounding country, are reprinted in part.

3. The Commission emphasizes the fact that only twelve crevasses occurred in the levees during this greatest of all the recorded floods and that the loss due to crevasses amounts to 1.06 per cent. of the whole yardage of the levees. While this is a good record compared with the data of earlier floods yet more territory (8,540 square miles) was inundated during 1912 than during the 1903 flood (6,820 square miles) although less than during the 1897 flood (13,580 square miles).

4. Twenty-three full page illustrations of the flood of 1912 are an innovation in the reports. The pictures depict a number of conditions which cannot be adequately explained in the text and add to its value for the lay reader.

The year 1911-12 was remarkable also in the low water conditions. The dredging season opened in June and closed in September which dates are some two months earlier than usual. The Commission says that the project depth of 9 feet and width of 250 feet were fully maintained throughout the season.

R. M. BROWN.

The New York of Yesterday. A Descriptive Narrative of Old Bloomingdale. By Hopper Striker Mott. xxvi and 597 pp. Maps, plans, ills., index. G. P. Putnam's Sons, New York, 1908. $10. 9½ x 6½.

West of Central Park is a region built up in dignity and with no little of the luxury which finds real estate expression. It is of this region of wealth that Mr.

Mott has written in this volume the village history. No historian could be better qualified, for he descends from the villagers of that day. New York yet remained a simple town, its social centers were still its churches. Quite naturally, therefore, the history of Bloomingdale is to be written about the beginning and the growth of its church, the Church at Harsenville. Church records are the best material for such history, the records in the books of marriages and births and the stone records which cluster under the eaves of the sanctuary. It was a placid history. Only once did war come near it to redden the buckwheat field in the battle of Harlem Heights, only once again did war sound its alarm and then it was no more than a threat in 1812. It is well to bear in mind that this is village history upon metropolitan soil. There are New Yorkers in quiet byways to whom it will be a pleasure to read of ancestors on this island when Bloomingdale was a region of farms and country seats. The maps and diagrams have been compiled with that accuracy which we have already learned to associate with Mr. Mott's historical researches on Manhattan Island. The illustrations show that he has drawn upon every available source of family portraiture, in most cases sources to which he enjoys hereditary right of access. WILLIAM CHURCHILL.

The Government of American Cities. By William Bennett Munro. ix and 401 pp. Index. Macmillan Co., New York, 1912. $2. 9 x 6.

A satisfying volume that presents with clearness and vigor the details and principles of city government. It outlines the development of governmental methods from the earlier times to the present, summarizes modern experiments and tendencies and includes a suggestive closing chapter on Municipal Reforms and Reformers. One is surprised to find how varied are the details of procedure in the many large cities of the country, and how widespread the dissatisfaction with local methods. The origin of the Commission form of government in the last decade, its expansion, its strength and weakness are considered at length. A similar careful treatment is presented of the advantages and possible disadvantages of the initiative, referendum, recall and protest. The book shows the author a master of his subject, the presentation is up to date, the style clear and pleasing, and the choice of subjects complete. Every person who would know what real citizenship means, and how progress may be sanely secured, should read this book. It is educative in the best sense for the professional politician, the reformer, the taxpayer, the voter and the citizen who in his ignorance and narrowness often defeats his own good intentions. RICHARD ELWOOD DODGE.

Forestry in New England. A Handbook of Eastern Forest Management. By Ralph Chipman Hawley and Austin Foster Hawes. xv and 479 pp. Map, ills., index. John Wiley & Sons, New York, 1912. $3.50. 9 x 6.

A book of regional forestry with the double purpose of being valuable to land owners in the east, and as a textbook of forestry in New England. It serves in a reasonable degree both ends for it is entertainingly written and packed with information and explanation. The first, eleventh and twelfth chapters are the most geographical; the first treats the geography of trees under conditions required by various species; the eleventh chapter discusses the original forests, "immense white pine forests stretching across Massachusetts to the foot of the Berkshires and extending well up the rivers of Maine, to Lake Winnepesaukee in New Hampshire, up the Connecticut into Vermont and New Hampshire and eastward from the borders of Lake Champlain" (p. 183). Southern New England had a larger percentage of hard woods.

The author traces the change of attitude of the people, from reverence and solicitude for forests in the early days to fear, and hate, then to mastery, and finally to deep solicitude and guardianship. This discussion, with the change of condition of the forests and the interactions between man and the forests, constitute very pleasing geography.

A careful description of the forests, region by region, their improvement by closer adaptation to conditions, their markets and their probable future among the other industries of New England constitute the forester's special part of the book. Tables, statistics, bibliography. G. D. HUBBARD.

Washington and the West. Being George Washington's Diary of Sept., 1784. Kept during his journey into the Ohio Basin in the interest of a commercial union between the Great Lakes and the Potomac River. And a commentary upon the same by Archer Butler Hulbert. 217 pp. Maps, ills., index. Arthur H. Clark Co., Cleveland, 1911. $1.20. 8½ x 6.

A transcription of Washington's Diary during a thirty-four day trip (Sept. 1 to Oct. 4, 1784) from Mount Vernon to Western Pennsylvania and back. The work of the author lies in an extensive commentary which gives the reader the historical setting and expounds the allusions in the original manuscript. Without touching upon the undoubted value of this book to the historian, two points in the book should be mentioned. The diary gives a good idea of the early traveling across the mountains and a few glimpses of the settlers along the way. In the second place, Washington studied carefully the conditions of the rivers and he constantly observed and noted the possibilities of transportation. This, as the author explains, "is a study of the possible course of a great transportation route from the Potomac to Lake Erie." At the end of the diary, Washington gives a summary of his investigations of a number of transportation routes and makes a plea for construction. R. M. BROWN.

The Everglades and Other Essays Relating to Southern Florida. By John Gifford. 2nd edition. 226 pp. Ills., index. Everglade Land Sales Co., Miami, Fla. 8 x 6.

A collection of thirty-one essays published during the last decade in various papers and magazines and here assembled for the public. One chapter compares the Everglades and the Landes of France; another the Everglades and the plains of the lower Mississippi. Most of the book is devoted to a statement of what can be grown in the Everglades and vicinity and in this phase the author makes a strong appeal to colonists, land purchasers and tourists. Hosts of tropical and subtropical fruits, rubber, vines, coffee, vanilla, camphor, bush fruits, vegetables and many fine timber trees are listed. Some, while favored by the geographical conditions, cannot be grown by our free labor in competition with peon labor products.

The great drainage projects now nearing completion are briefly described. No mention is made of alligators, rattlesnakes and the tough root stocks of much of the glade grass. G. D. HUBBARD.

The Scotsman in Canada. Vol. 1: Eastern Canada, including Nova Scotia, Prince Edward Island, New Brunswick, Quebec and Ontario. By Wilfred Campbell. 432 pp. Ills., index. Vol. 2: Western Canada, including Manitoba, Saskatchewan, Alberta, British Columbia, and portions of old Rupert's Land and the Indian Territories. By George Bryce. 439 pp. Ills., index. Musson Book Co., Ltd., Toronto, 1912. The two vols., $5. 8½ x 6 each.

The principle operative in the distribution of this work to different authors for each volume is apparently to select in each case the best authority for eastern and western Canada respectively. It matters not whether the volume we read chance to be by Bryce or Campbell, the work is instinct with race pride. Each has clung close to his precept, each recites the history of the Scot in the section of Canada which has come within his purview. But the method results in an odd sort of history. There have been stirring events north of the border and the narrative thrills in recounting the deeds of Highlander and Lowlander in connection therewith. But when in any such incident the Scot has been killed or arrested, the incident drops out of the book and we are left puzzled as to the outcome when mere French and English had to effect the settlement; so far as these authors are concerned, when Sandy and Jock take their fingers out of the pie there isn't any pie left. History is not to be written by any such process of exclusion; a picture reproducing only one of the colors of nature is no more representative than a photograph taken with the Roentgen ray. How far one of the authors qualifies as historian is shown in the first volume. Dr. Campbell

notes "that the ancient history of Britain goes away back coeval with that of the Jewish, and beyond, is without doubt." This statement he supports by citing the Welsh pedigree through Brute as great-grandson of Æneas, thence through Jupiter and Saturn, Japhet and Noah, and for the rest we have fewer qualms if we quote "Ap-Lamech, Ap-Methusalem, Ap-Enos, Ap-Seth, Ap-Adda (Adam), Ap-Duw (God)." And the reverend author continues "this tree agrees with that of Genesis." We are quite sure that the Scots have played a large part in the making of Canada, but the history of that work were better written with less intense racial pride and a broader background. WILLIAM CHURCHILL.

Annexation, Preferential Trade and Reciprocity. An outline of the Canadian Annexation Movement of 1849–50, with special reference to the questions of preferential trade and reciprocity. By Cephas D. Allin and George M. Jones. xii and 398 pp. Index. Musson Book Co., Ltd., Toronto, 1912. $2.50. 8½ x 5½.

This volume is to be looked upon as a storehouse of all accessible material bearing upon the theme. The authors have displayed great industry in ransacking the newspapers of the time for the purpose of securing evidence bearing upon the annexation unrest of 1849 as manifested in Canada and the United States. This diurnal record, most of which deserves to be forgotten, they have endeavored to adjust to the major political activities north and south of the St. Lawrence and the Great Lakes, for at that period the western frontier had no more than mathematical interest. Thus prepared this work cannot venture to rank as a history of the movement, but it will serve the future historian as the source from which to write the history of this attempt to create an annexation sentiment. Annexation was so largely to the fore in the discussions of the time that preferential trade and reciprocity were scarcely mentioned, certainly not to any such extent as should warrant their inclusion in the title as of equal rank.
WILLIAM CHURCHILL.

Le Canada. Les deux races. Problémes politiques contemporains. Par André Siegfried. 2ème édition. 415 pp. Armand Colin, Paris, 1907. 4 fr. 7½ x 5.

A careful perusal of this very well written and intensely interesting octavo confirms the impression created by its title, namely, that an extensive review of it finds no place in a geographical publication. Political problems are, naturally, connected with ethnography, and while that science is in direct touch with geography still the work before us is too exclusively political to warrant a discussion of its contents here. The work is worthy of high general commendation. Aside from the excellent literary style, there runs through the entire work a current of dignity and moderation setting a shining example to others. The points of view may not be accepted by everybody. The author is plainly an adept of the modern French republican tendencies, but, withal, he does his utmost to be fair and just however distinct and even antagonistic facts and conditions may be to his views and opinions. To anyone interested in Canadian questions and in the future of that country and its inhabitants, the book of Mr. Siegfried must not only be pleasant reading, but is also essential and indispensable. It richly deserves translation into other languages. AD. F. BANDELIER.

Panama Canal: What it is, what it means. By John Barrett, 120 pp. Map, ills. Pan Amer. Union, Washington, 1913. $1. 9 x 6.

Fresh evidence of the excellent work the Pan American Union has undertaken will be found in this little volume, in which the attempt is made to diffuse correct information regarding the greatest of modern engineering feats. The significance of the Panama Canal in its relation to world trade and industry is described in a manner intended to answer the questions likely to be asked by anyone desirous of acquiring information on the general value of this waterway. The book might have been enlarged with profit so as to include twice its hundred and twenty pages. Fortunately the partial bibliography appended will enable readers to refer readily to ampler sources of information. LEON DOMINIAN.

Our West Indian Neighbors. The Islands of the Caribbean Sea, "America's Mediterranean"; their picturesque features, fascinating history, and attractions for the traveler, nature-lover, settler and pleasure-seeker. By Frederick A. Ober. 433 pp. Ills., index. James Pott & Co., New York, 1907. $2.50. 8 x 5½.

This is an extremely interesting, popular sketch of the traditions, history and present status of the islands of the West Indies. The book conducts the reader to the Bahamas, Cuba, Jamaica, Haiti, Porto Rico and along the Lesser Antilles to Trinidad. The chapters are filled with a variety of information concerning the picturesque features, climate, the historical background and present activities of the inhabitants and they offer much that the traveler or the student wishes to know. It is impossible not to contrast the foreign governed islands like Porto Rico and Jamaica with the representatives of native rule, or misrule, as exemplified in Santo Domingo and Haiti. A large number of the smaller and less known islands have more than their proportionate share of the book which adds to the value and enriches the romantic side of the volume.

R. M. Brown.

SOUTH AMERICA

Le Brésil Méridional. Étude économique sur les États du Sud, S. Paulo, Paraná, Santa-Catharina et Rio-Grande-do-Sul. Par C. M. Delgado de Carvalho. 529 pp. Map. Bibliotheque Nationale de Rio de Janeiro, 1910. 7½ x 5.

A compendium of many printed works about the four southern provinces of Brazil. Although the author's name sounds Brazilian there is no sign of his direct observations in the work, a personal note that is missed To enliven his pages, quotations are made from those who have visited the region, among them often and acceptably M. Pierre Denis. Even the taste and effect of *maté* is described in this way, at second hand. But there is much good matter about colonization in the various provinces, and life and resources. Oddly, it is difficult always to ascertain what sort of prices the settlers pay for their land. A useful little sketch map precedes a brief account of the relief of the land and the main work gives an account of São Paulo, as the land of coffee, Paraná and Santa Catharina, as the land of maté, and the Rio Grande as the land of stock raising with much detail of interest regarding the present condition and future prospects of the people.

Mark Jefferson.

The Sea and the Jungle. By H. M. Tomlinson. 354 pp. Duckworth & Co., London, 1912. 7s. 6d. 9 x 6.

A central fact concerning the vast forest of Brazil stretching across the South American continent from far below to a few degrees above the equator is that its luxuriant vegetation defies the efforts of casual settlers. Nothing less than a teeming population could properly subdue it to human uses. This forest region is the largest compact body of fertile territory that yet remains in any part of the world unimproved and—with incalculable treasures for commerce as well as for science—in great part unexploited. Nearly the entire population of Brazil is still found in a comparatively narrow strip of land extending from the line of Uruguay, northward along the Atlantic coast to Pará, and thence to Manaos and to outposts on the rivers. While the poles kept man at a distance by cold, this forest has accomplished the same result by the power of its rank growth, by its too abundant tropical resources—in a word, by its wealth. Mr. Tomlinson gives us in the more important part of this book such impressions of the Brazilian forest as he received in the course of an interesting voyage. He sailed on the English steamer *Capella* from Swansea to Porto Velho, near the cataracts of the Madeira River. There, as he says, in the center of the continent, "again the conquering forest is being attacked." The two-thousand ton steamship *Capella* carried supplies for the establishment at Porto Velho, eastern terminus of the new Madeira-Mamoré Railway. We commend especially the author's account (pages 221 to 325) of this railway undertaking, as he saw it in 1909-10, and the description of his longest journey through the conquering forest at a distance from the ship.

AFRICA

The Periplus of Hanno. A Voyage of Discovery down the West African Coast, by a Carthaginian Admiral of the Fifth Century, B. C. Translated from the Greek by Wilfred H. Schoff. 27 pp. Map, ills. Commercial Museum, Philadelphia, 1912. 25 cents. 9½ x 6.

Periplus is the ancient name given to the account of a coasting voyage, or to the written description of a particular coast and its harbors, which description was considered to be of special value to coastwise trade. The Periplus of Hanno is one of the oldest extant, yet it must be admitted its exact date cannot be determined. It is a very brief account of a Carthaginian colonizing expedition which followed the coast of Africa from Gibraltar southward perhaps as far as Sierra Leone. The editor has given an English translation of the Periplus, has attempted to identify the localities mentioned, and has quoted extensively from other writers who have referred to this interesting relic of Carthaginian literature, or described the geographical and other features of this region as they themselves have known them.

E. L. STEVENSON.

Aspects of Algeria. Historical, Political, Colonial. By Roy Devereux. xi and 315 pp. Map, ills., index. E. P. Dutton & Co., New York, 1912. $3.50. 8½ x 6.

These chapters are steeped with traditional and historical allusions. They cover a large variety of themes; some give impressions of the natives, some are historical, some discuss the invasion of the Turk and the French, others are prophetic and two deal with commercial topics. The Industrial Development of Algeria and Date Culture in the Sahara seem almost out of place as chapter headings in this rather impressionistic story of Algeria, but the treatment of the topics is consistent with the rest of the book. Excellent word paintings of the Sahara may be found in these two chapters; and if the philosophy and the prophecy of the author are not taken too seriously, the volume offers a number of delightful hours to readers who are somewhat familiar with Algeria's story.

ROBERT M. BROWN.

Le Maroc. Par Augustin Bernard. viii and 412 pp. Maps. Felix Alcan, Paris, 1913. Fr. 5. 9 x 5½.

Prof. Bernard is well known through his work, in collaboration with Maurice Wahl, upon the study of the nearer colonies of France in Africa, particularly the monograph on Algeria which was published in 1908. This volume on Morocco follows the method employed in the treatment of Algeria, a method that has proved its substantial worth. Passing over the sections in which Prof. Bernard discusses the geography and the history of Morocco and the European commercial and political invasion, we find the author at his best in the third section, in which he subjects to critical analysis the civic conditions of indigenous society. French colonial effort seeks to preserve the condition of society natural to the community and to make only such changes as may bring life under the protection of French law. Unintelligently carried into effect this may load the French colony with an overhead weight of administration that produces ruin, and of this Tahiti is an excellent example. But nearer the metropolis and more closely under control of public opinion at home this system affords an interesting laboratory for the study of colonial method. The monograph, complete in all necessary presentation of data and marked by the most scholarly tone in treatment, will be found indispensable by the student of Moroccan affairs.

WILLIAM CHURCHILL.

Ai Confini Meridionali dell'Etiopia. Note di un viaggio attraverso l'Etiopia ed i paesi Galla e Somali. Di Carlo Citerni. 281 pp. Maps, ills. Ulrico Hoepli, Milan, 1913. 8 Lire. 10 x 7.

This description of things seen in the course of a journey through southern Ethiopia is compiled from notes jotted in a light observational vein and which hence found no space amid the technicalities of the report transmitted by the

author to the Italian Minister of Foreign Affairs. The narrative should appeal to readers of Italian as it will enable them to acquire first-hand information on a valuable section of the Italian boundaries in Africa.

Geographers will avail themselves of the scientific results of Captain Citerni's mission as embodied in the three appendices. The geographical coordinates which were determined astronomically will come handily within the grasp of cartographers since they will permit location of points along the boundary between Ethiopia and Italian Somaliland.

The meteorological observations taken during the trip, a critical examination of which accompanies the text, constitute as valuable a contribution to the geography of the region as the information conveyed by the maps compiled by the topographers of the expedition. The plan of Addis Abeba on a scale of 1:25,000 as well as the bearings and distances determined along both sides of the party's route are valuable parts of the work. The whole undertaking bears witness to a keen appreciation of the value of scientific knowledge as applied to colonial development. LEON DOMINIAN.

Le Katanga: Province Belge. Par MM. A. Adam, A. Bolle, P. Chaudoir, J. Cornet, F. Dellicour, A. de Melotte, R. Dubreucq, C. Firket, J. L. Frateur, P. Le Marinel, E. Slosse. 154 pp. Maps. Assoc. des Licenciés sortis de l'Université de Liége, 1911. 9½ x 6½.

This book is largely an advertisement of the Katanga province of the Belgian Congo and it is published primarily for the purpose of spreading sound ideas of colonization among the emigrants of the mother country and in the hope of attracting settlers to this rapidly developing part of Africa. A very elementary statement of the climate and of the sanitary régime to be followed allows the prospective pioneer to prepare himself for a safe residence. The resources in minerals, in agricultural possibilities and in grazing areas are duly catalogued. The authors, while they are alive to all the advantages of the Katanga plateau, have not failed to call attention to some of the undesirable characteristics as for instance the presence of the tsetse fly and its effects upon the grazing industry. The book ends with a list of gratuities which properly qualified persons may receive from the government as inducements to colonization. The volume is not a promoter's handbook; on the contrary it attempts to present a truthful picture of the present status of Katanga. R. M. BROWN.

The Story of the Zulus. By J. Y. Gibson. New edition. vii and 338 pp. Ills., index. Longmans, Green & Co., London, 1911. $2.50. 9x6.

In the days of early settlement the Europeans were in little danger from the aborigines of South Africa. The Kaffirs lacked the courage which might make their numbers at all considerable. The Bushmen, interesting now as a possible survival of palæolithic man, were considered mere curiosities or else were hunted down like noxious vermin. It was not until the inner frontier to the north of the first settlements was reached that white men encountered the Zulu. It was the Boer who first met this savage race, the Dutch colonist who preferred to pierce the desert rather than associate with the English who were displacing him in his first colony.

At this point, Mr. Gibson begins his story of this important race, for he has found it all but impossible to gather traditions of earlier history. It is a careful narrative; dates are established as well as it is possible to effect in the tales of a folk who make no record of the passing years. The author pretends to none of the philosophy of history, he is content to be an annalist; as such his narrative, particularly as he was a participant in much of the trouble of the last fifty years, will stand in the first rank as an authority to be used by the future historian of the new dominion in temperate Africa. WILLIAM CHURCHILL.

Les Sociétés Primitives de l'Afrique Équatoriale. Par Dr. Ad. Cureau. xii and 420 pp. Map, ills. Armand Colin, Paris, 1912. Fr. 6. 8 x 5.

In a work whose grace of diction will hold the attention, Dr. Cureau has written a story which is superficial, if it be permissible to employ that word

without any of the adverse connotation which has grown about its use. It is easy to see, every page gives clear proof, that he is most intimately acquainted with the people among whom so many active years of his life have been passed. His particular theme in this research is the examination of the civic development of primitive races; that is the surface which authorizes the designation of his work as superficial in its best sense. Yet all the time he is reaching down below that civic surface into the psychology of elemental man for the discovery of actuating motives which lead to the chief, the thaumaturge, the village and the kingdom. As his study is of the political surface he cannot afford to probe much deeper than the family as the social unit. Here he is brilliant. He expounds the origin of the African family, the relation of individual unit to the family with which he is attached whether by birth or by purchase or even by capture, the physical relation of the family unit to the terrain in which it finds itself and ultimately the interrelation of such family units in alliance of peace or its converse war. The work is professedly a study in primitive sociology, but it accents the need of the like sympathetic study of beginning man in the field of primitive psychology. This field is as yet almost untouched; in the nature of the advance of civilization it is a subject where postponement will prove fatal.

WILLIAM CHURCHILL.

ASIA

Across China on Foot. Life in the Interior and the Reform Movement. By Edwin J. Dingle. xvi and 446 pp. Map, ills., index. Henry Holt & Co., New York, 1911. $3.50. 8½ x 5½.

The itinerary of this pedestrian includes a trip from Singapore to Shanghai by steamer, the entrance to the Chinese interior, Shanghai to Ichang, by the river steamer of the Yangtse, a journey by a small boat through the gorges of the upper Yangtse (Ichang to Chungking), and finally the walking tour from Chungking to Bhamo in Burma. Most of the book is devoted to incidents and descriptions of the walking trip across the provinces of Szechwan and Yunnan in western China. The author had no definite plan of campaign, but under the simple banner of a "personal desire to see China from the inside" the journey was undertaken. As much of the land traversed is comparatively unknown the fleeting glimpses of the scenery given by the author's camera are insufficient, while the text affords no strong impression of the physical features. The descriptions of native life are fuller and often vivid but the whole is largely detached from the underlying ties of racial sympathy and cooperation and from any of the physical causes which may have been influential in the formation of habits and conditions. The result is that the general conclusions and many philosophical discussions are based frequently on superficial conditions of life rather than on the deeper meanings. If the reader be charitably inclined towards some attempts at rhetorical expression the book can be enjoyed. The author is a journalist and his stories of human activities do not belie his training. The Chao-T'ong Rebellion of 1910 of which but rumors reached the outside world is an instance of the reporter's ability to draw a picture of conditions, movements and results. A number of appendices, compilations and original materials cover a wide range of topics including the Hankow riot of January, 1911, and the Tonking-Yunnan R.R.

ROBERT M. BROWN.

Chau Ju-Kua: His Work on the Chinese and Arab Trade in the 12th and 13th Centuries entitled Chu-fan-chï. Translated from the Chinese and Annotated by Friedrich Hirth and W. W. Rockhill. x and 288 pp. Map. Imp. Acad. of Sci., St. Petersburg, 1911. 10½ x 8.

It would be impossible to extend too warm a welcome to this work or to felicitate American scholarship too highly that it includes sinologues who can so richly present such a work to the history of geography.

Chau Ju-kua, eighth in line of descent from the Emperor Tai-Tsung, was a man of education. The fact was prerequisite to his preferment to the post of Inspector of Foreign Trade in Fukien. He must have passed the third and last of the examinations of the artificial system of Chinese learning. His period of

activity was the middle of the thirteenth century, more than a hundred years before Marco Polo was animated by a like ambition and gave the knowledge of China to the western world.

Chau Ju-kua opened to his fellow countrymen the knowledge of the world beyond the Middle Kingdom. He published the story of the Outer Barbarians. He has written chapters upon forty-five countries, and upon eight lands within the sea; the results of his investigations which had commercial value are summed in forty-three chapters ranging from camphor to beeswax. Descriptive geography was an old science when he wrote, but he deserves to stand as the father of economic geography. His record begins close at home with Tongking but it reaches far. He deals with the greater lands of Indonesia, with Ceylon, with India, with Baghdad, with the ports of the Red Sea and thence to the Mediterranean. In this great sea about which European culture grew into civilized society he learned somewhat as to Egypt and Alexandria, as to Sicily, perhaps Rome, and most remote of all the world the southern coasts of Spain and beyond Spain "if one travels by land 200 days' journey the days are only six hours long."

This is a wide stretch of geography to be picked up in Fukien, for we have no hint that Chau Ju-kua ever went to sea upon any of the voyages which he describes. In his office we can picture him eager to converse with the shipmen and diligent to make record of the tales they brought him, many at third and fourth hand, yet all surprisingly accurate in a wealth of unimportant yet interesting detail. It reflects great credit upon the editors that they have proved able to establish the identity of almost all the outer lands which their Chinese author has recorded in the Chinese system of phonetics which must have entailed great difficulty upon him when he was recording the tales of the rovers and which it is equally difficult to render from the Chinese into western idioms. We find an interesting instance of accurate ingenuity in the assignment of Chau Ju-kua's name Mu-lan-p'i to southern Spain. In the eleventh and twelfth centuries this was the kingdom of the Al-Murabitūn; our Chinese author comes as close to the name as did the Spaniards with their name Almoravide. We find particular interest in the name P'o-ni for Borneo, and a note that this name appears in the Man-shu in exactly the same form in the latter part of the ninth century. We cannot see that Chau Ju-kua means Borneo as we employ the name for the whole island; his mention of a city of 10,000 and fourteen districts will better fit the sultanate of Brunei from which the name has been extended to the island. This gives to Brunei an age somewhat older than we had believed to be the case, but our Chinese authority demolishes all the speculations, also linguistically open to suspicion, which have sought to identify the Borneo or Brunei name with the settlement on the Pāni river on the east coast of Sumatra.

We could wish that our American scientific bodies had had the credit of publishing this monument of geography. That it bears the imprint of the great Imperial Academy of Sciences of St. Petersburg testifies to the high repute of Prof. Hirth and Minister Rockhill. In their English they suffer from the foreign compositor only in the misuse of the inverted comma in place of the apostrophe and the general inability of Continental typography to make the proper division where words are carried over the end of lines. WILLIAM CHURCHILL.

Die Sunda-Expedition des Vereins für Geographie und Statistik zu Frankfurt am Main. Von Dr. Johannes Elbert. Festschrift zur Feier des 75 jährigen Bestehens des Vereins. Band 2. xv and 373 pp. Maps, ills., index, Hermann Minjon, Frankfurt am Main, 1912. Mk. 20. 12 x 9½.

The promise of the former volume of this weighty contribution to the geography of central Indonesia is richly carried out to the end. Little remains to be said in addition to the former notice (*Bull.*, Vol. 44, p. 923) save to note the detail of country traversed. In supplementing the work of the Sarasins in Celebes, Dr. Elbert, at the end of the former volume, had completed his survey of Muna, a small outlier off the southeastern peninsula. Continuing from that point he examines Kabaëna and then proceeds to Sumbawa where he has subjected the whole north coast to detailed examination. In like manner he deals with central Flores. The end of his studies is reached in the island of Wetar.

For several years the existence of the mountain lake in the inner part of this island has been accepted but without precise information, for it was regarded as a sacred spot and the administrators of the Dutch East Indies were quite content to avoid the trouble which would surely follow any attempt to explore the lake. Dr. Elbert, however, has visited it, not without great danger, has established its position and has brought out our first definite information as to the speech and customs of the Tihu people who surround the lake and religiously defend it from intruders. The linguistic results of the expedition are presented in a vocabulary of some 700 words in two Sumbawa languages which exhibit many of the characters that distinguish the Malay of the Philippines from the mixed speech of Java and Sumatra. WILLIAM CHURCHILL.

AUSTRALASIA AND OCEANIA

Reisewege und Aufenthalte in Melanesien. Von Dr. Otto Schlaginhaufen. 20 pp. Maps. Reprint, Verhandl. Schweiz. Naturforschenden Gesellsch., 94. Jahresversammlung, 1911. Vol. 1. Solothurn.

This is a very clear and an interesting day book of the author's travels in Neu Mecklenburg and New Guinea, 1907-9, to which two itinerary charts are appended. In an inset of the former of these charts lies the particular value of the record for students of Melanesia. This in quite satisfactory detail and upon a scale of 1:187,500 is a map of the Feni Islands which lie (4° S.) off the coasts of Neu Mecklenburg. Upon the earlier charts these two islands, Ambitlé and Bábase, are variously designated Aneri, Wuneram, St. Jan and Bournand. Dr. Schlaginhaufen gives the names and position of five mountain peaks, two rivers and thirteen communities on Bábase; on Ambitlé, considerably the larger island, he places twelve peaks, five rivers, eighteen communities and sites of three abandoned, and in addition gives Balim as the name of the northern and Pigan of the southern regions of the island. Thirty years ago I tried in vain upon the spot to find a name for the group. St. Jan and Bournand are known only upon charts. Aneri I found to be a name in use only among the Siara on the opposite coast of Neu Mecklenburg. Feni was in use on the islands but I could not apply it further than to the region now noted as Balim. Parkinson ("Dreissig Jahre in der Südsee," page 302) attributes the name Feni (Finni) to the employment of the people of Tanga, the next northerly archipelago. This need cause no surprise, for very few of the Melanesian lands have names for aught more general than the village and its beach, for the stream and the mountain peak. It is very interesting to note that in the six dozen names which this careful traveler has supplied for these insignificant specks of land in a distant sea not one has the slightest trace of Polynesian influence. Thirty years ago I noted the population as distinctly Polynesian. Their disappearance is not surprising and gastronomic depopulation is far from uncommon.

WILLIAM CHURCHILL.

Nova Guinea. Résultats de l'Expédition Scientifique Néerlandaise à la Nouvelle-Guinée en 1903 sous les auspices de Arthur Wichmann. Vol. 2, 2éme Partie: Entdeckungsgeschichte von Neu-Guinea (1885 bis 1902). Von A. Wichmann. pp. 371–1026. Maps, index. E. J. Brill, Leiden, 1912. £2 2s. 11d. 12½ x 10.

This ponderous volume (in reality it is but the latter half of the second volume of its series) shows the great care expended upon the results of Wichmann's exploration of New Guinea in 1903. For work of this character the publication of final results in less than ten years is properly to be regarded as evidence of the utmost industry. In this half volume we find a concise summation of the work of every explorer who was occupied upon the great island from 1885 to 1902, up to the date of this Dutch expedition. In each brief record Dr. Wichmann has shown the nature of the expedition, the limits of territory within which it operated, the results of all discovery made by it, and, wherever necessary, has commented upon the value of these results. Expedition is rather too formal a designation. He has included every voyager who has left written

record of New Guinea, activity of any sort whatever. The reviewer finds particular interest in these records because, engaged himself in waters immediately adjacent during the latter period of the former half of this volume and the early period of this latter half, he was familiar with all of the work and with many of the workers. For instance Capt. Wawn, master of vessels in the labor trade, cannot be classed with the explorers; yet Dr. Wichmann shows his comprehension of the evaluation which is proper to be given to Wawn's narrative, and exhibits rare skill in picking out from a work which was really apologetic for a traffic in men that was little other than government-regulated slavery, all the really valuable contributions to the knowledge of New Guinea which the labor trader has included in the record. The charts, of which there are thirty-six in this fascicle, are unfortunately greatly reduced in order to bring them within the page, yet they will be found valuable memoranda for those who will employ this volume as a concise summary to direct their research to the original sources. The volume is an essential introduction to the results of the Dutch expedition. In general it will be found a most satisfactory encyclopedia of all that was known of New Guinea up to the time Wichmann began his work.

WILLIAM CHURCHILL.

Geology of New Zealand. By P. Marshall. viii and 218 pp. Maps, ills., index. Minister of Education, Wellington, N. Z., 1912. 8½ x 5½.

An interesting book with up-to-date description and a complete geologic map. A striking absence of nearly all Paleozoic rocks in both islands. Archean rocks and metamorphic schists in South Island and Triassic terranes in North Island determine the main lines. Off shore, at one time, volcanic mountains were welded to the axes by Cenozoic and recent sediments in great coastal plains. Such plains also border the east side of both islands, and more sparingly much of the west side. Downs of loose sandstones lie in both islands, and more or less continuously on both sides, between the coastal plains and the axes. Radial drainage on the slopes of Mt. Egmont; islands of rare beauty, equable climate and great resources. The chapters on rivers, glaciers, the atmosphere, volcanoes, lakes and the sea coast constitute a brief course in systematic physiography with local illustrations. G. D. HUBBARD.

Über die astronomischen Kenntnisse der Naturvölker Australiens und der Südsee. Inaugural-Dissertation . . . Univ. Leipzig. Von Alfred Kötz. xiv and 73 pp. Ills. Robert Norske, Leipzig, 1911. 9 x 6.

The "Doktor-Dissertation" is too often something eminently artificial and a record of uninspired industry. A bibliography is a required feature, yet the catalogues of the Leipzig book dealers shows that aspiring doctors can buy their bibliographies ready made for insignificant sums. It is fair to assume that these junior German students have exhausted the collation of their themes so far as their library facilities extend, and, in the German universities, these facilities are excellent. Accordingly this tract will serve the convenience of a guide to the literature of primitive astronomy in Australia and the South Seas, and the student who may feel any attraction in the theme will be in a position to correct the errors of interpretation. It is highly probable that nowhere but in an inaugural dissertation would it be possible to join such dissimilar types of humanity as the Australian and the Polynesian. WILLIAM CHURCHILL.

EUROPE

Pflanzengeographische Wandlungen der deutschen Landschaft. Von Hans Hausrath. vi and 274 pp. Index. B. G. Teubner, Leipzig, 1911. Mk. 5. 7½ x 5½.

Beside much theoretical matter which is evidently warmly disputed by its students Prof. Hausrath's volume has an admirable picture of the relations of man and the forest in Germany ever since the Ice Age. The character and place of the forests of to-day have been mostly fixed by man. The men of the later Stone Age arrived in the land before the woods had completely got

possession and settled on the open spots. Archæological studies have located these settlements and given good grounds for the belief that woods never grew on them to any great extent. Man's early effect on the forest was to keep it out of the regions he settled, though it was in a fair way when he came to take possession of the whole country. He destroyed bits of border woods mostly, perhaps, by his cattle browsing and occasional fires, but the virgin forest persisted unchanged, though not so continuous as Tacitus reports, for the openings of the German settlements were scattered through, but a vast forest it remained till Carlovingian times. The German was a good farmer and had a better plow than the Roman. The forests were cut, mainly at the behest of the cloisters, between 750 and 1350 A. D. MARK JEFFERSON.

The Tourist's Russia. By Ruth Kedzie Wood. 253 pp. Map, ills., index. Dodd, Mead & Co., New York, 1912. $1.25. 7½ x 5.

The book puts in clear and usable form the necessary information about how and where to travel in Russia with many details as to short excursions off the main line of travel. Written from first hand information by one who loves Russia, the volume gives a new impression of the country and its people. It is not a Baedeker in completeness, or in brevity and pithiness of treatment, but it is a serviceable book that ought to help make travel in Russia more enjoyable. RICHARD ELWOOD DODGE.

POLAR

Expédition Antarctic Française (1903-1905). Commandée par le Dr. Jean Charcot. Hydrographie, physique du Globe. Par A. Matha et J. J. Rey. vi and 615 pp. Maps, ills. Gauthier-Villars, Paris, 1911. 15 frs. 11½ x 9.

The French Antarctic Expedition of 1903-1905, organized and commanded by Dr. Jean Charcot, brought back scientific documents of very great value. The present volume contains the hydrographical, meteorological and geophysical observations made by Lieutenants A. Matha and J. J. Rey, as well as the discussion of these observations. In an introduction of twenty-four pages Dr. Charcot gives clearly and concisely the history of the preparations for the expedition, refers especially to the construction of the vessel *Le Français,* gives a list of the ship's officers and crew, outlines the programme for work as it was laid down before the departure of the expedition and concludes with a short history of discoveries made before 1903 on the west coast of Graham Land.

The six maps accompanying the volume show clearly the value of the hydrographical work carried on by this first antarctic expedition of Dr. Charcot. The coasts of the islands of Palmer Archipelago were very carefully surveyed excepting, naturally, those in de Gerlache Strait, the map of which had previously been drawn by the Belgian Expedition. The maps of the Bay of Flanders and of Wiencke Island, discovered by the Belgian Expedition, were corrected as the work of the hydrographer of the *Belgica* was somewhat superficial. Otto Nordenskjöld had occasion to make the same remark on Hughes Inlet.

Farther south the map of Kaiser Wilhelm Islands was drawn in a very detailed manner because the expedition wintered in a bay of one of these islands. Finally, a portion of the coast of Graham Land was also surveyed in detail.

It seems to me that a remark about the names "Roosen Channel," "Bismarck Inlet," and "Kaiser Wilhelm Islands," adopted by Charcot, will be of some interest. I had the map of Friederichsen on the *Belgica* and during the voyage I had no doubt that the "Bismarck Strasse" of Friederichsen was the inlet to Flanders Bay and Belgica or de Gerlache Channel. I was not alone in this opinion. But this idea was not adopted by the hydrographer of the Belgian Antarctic Expedition, and Charcot has done his work over again even to the names adopted. (Charcot p. 33.)

Among the scientific researches of the French expedition the study of the tides, the determination of gravity and the observation of atmospheric electricity are of special interest and great value. These observations show the highly scientific character of Charcot's expedition, and the results obtained in these three fields of research do honor to the persistent labor of Matha and Rey.

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The triangulations also are worthy of mention. Oceanographical work, on the contrary, was neglected as only density and temperature of surface waters were taken.

The reports on the meteorological and magnetical observations occupy the greater part of the volume (pp. 261-573 and 575-615). The meteorological journal consists of hourly observations taken from Feb. 1, 1904 to Feb. 15, 1905. The results of these observations complete in a very satisfactory manner our knowledge of the climate and meteorology of the antarctic region south of Cape Horn and ought to be discussed together with those made by the expeditions of Nordenskjöld and Bruce and those of the second expedition of Charcot.

The Aurora Australis was seen only three times, while farther to the southwest, in 1898, I noted this phenomenon sixty-two times. To explain this fact one has to admit that in the south as well as in the north the geographical distribution of auroras depends upon the distance from the magnetic pole. The blue fog (p. 460), which was also described in my report on the optical phenomena of the atmosphere observed during the Belgian Expedition, seems to me to be a particular case of twilight phenomenon. It would be interesting to compare this blue fog phenomenon with the blue colorations which one sometimes observes in mountainous regions before twilight, when the sun is still above the horizon so low that great expanses of landscape are sunk in the shadow of the mountains. HENRYK ARCTOWSKI.

HISTORICAL GEOGRAPHY

Die Koblenzer Fragmente zweier handschriftlichen Karten von Deutschland aus dem 15. Jahrhundert. Von A. Wolkenhauer. Reprint, Nachrichten K. Gesell. der Wiss. zu Göttingen, Philol.-hist. Klasse, 1910, No. 1, pp. 17–47. Maps. 9½ x 6½.

In this monograph the author gives a detailed description of two parchment manuscript maps of Germany dating, as he believes, from the second half of the fifteenth century, but before 1490. The maps appear from the reproductions to be rather crude sketches, yet are particularly interesting to students of historical geography. They are thought to have been drawn in Nürnberg, then a center of scientific, literary and artistic culture. The author has made a very exhaustive study, quite characteristically German in its critical analysis of the contents of the two sketches. He has clearly demonstrated how much of real geographical and historical interest may be found in the maps of earlier centuries, inaccurate as they may be in specific details, but accurate in making record of the geographical knowledge of the times when drawn. Questions relating to the projection, to the regions presented, to the topography of these regions, to place names and the peculiarities of the same have all received careful consideration, as have other questions relating to the comparative value of the maps, to their probable date, to the author and his special peculiarities as exhibited in his work. E. L. STEVENSON.

ANTHROPOGEOGRAPHY

Die serbokroatischen Kolonien süditaliens. Von Milan Resetar. Schriften der Balkankommission, Linguistische Abteil., IX. 402 pp. Ills. Kaiserl. Akad. der Wiss., Wien, 1911. Kr. 12.50. 12 x 9½.

This volume concerns itself with the highly interesting Slavic enclaves in Molise of the province of Naples, the three communities of Montemitro, San Felice Slavo and Acquaviva-Collecroce. Remote from the lines along which the greater events of history moved in the Middle Ages, the three communities have remained singularly conservative of ancestral type in habit and speech. Even at the present they lie remote from the travel routes and scarcely touched by the modern life of Italy save in so far as the Government reaches out to them hands collecting taxes and drawing their youth into military service. The moot point of the period at which this Molise colony was founded and the circumstances under which it came to fixity is carefully discussed with a full apparatus of historical record. Upon the same point the author, with great skill in the interpretation of speech record, masses the weight of his philological

acumen in the linguistic section of the work. He succeeds in orienting the Molise dialect upon the great body of Slavic speech and shows whence the migration was derived; and, by a critical examination of speech forms, is able to identify its period quite independently of the formal record of documents. It affords a most interesting example of the contribution of philology to the art of the historian. WILLIAM CHURCHILL.

Palæolithic Man and Terramara Settlements in Europe. Being the Munro Lectures in Anthropology and Prehistoric Archæology in Connection with the University of Edinburgh. Delivered during Feb. and March 1912. By Robert Munro. xxi and 507 pp. Ills., bibliogr., index. Oliver & Boyd, Edinburgh, 1912. Macmillan Co., New York. 16s. 10 x 7.

Viewed as a compendium this work is very timely. The sudden increase of our knowledge of the earliest men of Europe derived from the discovery of their graphic arts in southern France and northern Spain, the recent discoveries in England of the man of Galley Hill and the woman of the Piltdown skull, these make it of extreme value that we have in convenient summary the results of previous discovery. The volume is introductory. Relative to the study of prehistoric man it is in a certain sense a primer; therefore it is most strongly characterized by the summation of definitely accepted results of the early finds. Dr. Munro, in these lectures to beginners in anthropology, did not find it incumbent upon him to attempt the decision of controverted points. He has rendered more valuable service by stating with fairness each theory of explanation. This is particularly well shown in his chapter on *Pithecanthropus erectus*. While these lectures are expressly designed to prepare students for the more detailed study of fossil man, they will serve the general reader excellently as affording a clear conspectus of all that is known on the subject up to the present. WILLIAM CHURCHILL.

Die germanischen Stämme und die Kulturen zwischen Oder und Passarge zur römischen Kaiserzeit. Von Erich Blume. 1. Teil: Text. vi and 213 pp. Map, ills. Mannus-Bibliothek, No. 8. Curt Kabitzsch, Würzburg, 1912. Mk. 8. 10½ x 7½.

This volume finds its place in a considerable and rapidly growing library of the literature of the early history of Europe. It deals with a history of which there are no written records. It is based upon the record yielded by careful search of the soil itself for its treasure of trifles lost or discarded ages ago. Here we have the record for a small area in Germany, no more than the district between the Oder and the Passarge, and a study limited to the Roman imperial age. In general this method of close study of limited areas and particular epochs has been found to yield the most satisfactory results. The method of such work has become standardized into a conventional form based upon the results of similar experience. The nature of the terrain is carefully set forth in order to afford the best information about the sites where finds are made. Each object is described as to its site and the conditions of its discovery, objects of similar type are brought together for comparison in the discussion. The museum deposit is sedulously noted so that the special student may be able to pursue his researches with ease and celerity. The best result of any such monograph is to serve as an index whereby the more general investigator may lay his hand upon all the material remains which may serve in the elaboration of whatever thesis he may contemplate. The wealth of the illustrations in this volume should prove of great assistance. WILLIAM CHURCHILL.

PHYSICAL GEOGRAPHY

Diagrams of Storm Tracks and Thermo-Isopleths. By J. I. Craig. 2 pp. Diagrams. Reprint, Meteor. Rept., 1910, Part 2, Surv. Dept., Egypt. Cairo, 1913.

Mr. J. I. Craig, whose name is already well known in connection with the meteorological work of the Egyptian Survey Department, has lately plotted the

tracks of the cyclonic storms which crossed the eastern Mediterranean and the neighboring lands during the years 1906-1910, *i. e.*, of those storms which are of importance in bringing Egypt its winter rains. It is worth noting that cases are on record of a control over Egyptian weather by a cyclonic system as far north as the Gulf of Bothnia. Egypt has dry years and poor crops when the storms which cross the eastern Mediterranean are not well developed, or when their tracks lie farther north than usual. The plotting and study of these tracks are of great and immediate importance in relation to weather forecasting in Egypt, but every student of the climatology of Egypt and of other portions of the eastern Mediterranean region is under obligations to Mr. Craig for giving us these interesting charts. A study of climate without a knowledge of the controls of the weather types which make up the climate is aimless and dead. We confess that we ourselves have a more vivid idea of the climate of Egypt and of its controls since our examination of Mr. Craig's charts.

In the same report are two diagrams showing the thermo-isopleths of Cairo and Alexandria. This sort of graphic representation of temperature conditions makes the daily and annual march of temperature very clear, and serves to summarize a large amount of climatological information within a very small compass. It is a pity that such diagrams are not often modelled, as was done by Mr. A. H. Palmer a few years ago with the thermo-isopleths of Boston, Mass.

R. DEC. WARD.

Weather Science. By R. G. K. Lempfert. 94 pp. Maps, index. Dodge Publishing Co., New York, 1912. 20 cents. 6½ x 4½.

The subject matter covered in the 94 pages of this little book can be best indicated by stating the title of each chapter.

1. Meteorological Observations and the Processes Involved in Atmospheric Changes; 2. Synoptic Meteorology; 3. Forecasting From Synoptic Charts; 4. Average Values; 5. Departure from Average Values—Correlation; 6. The Upper Air; 7. Bibliography.

An effort seems to have been made to present the discussion in terms understandable by the layman or the elementary student. It can hardly be said that the author has been successful in this attempt throughout the book. However, the volume is good for the student interested in the meteorology and weather of England and continental Europe who desires a very brief resumé of conditions in these regions. The bibliography, unless intended to include only the books used in the compilation of this volume, is quite incomplete.

EUGENE VAN CLEEF.

An der See. Geologisch-geographische Betrachtungen für mittlere und reife Schüler. Von Prof. Dr. P. Dahms. In series: Dr. B. Schmids naturwiss. Schülerbibliothek, 3. iv and 210 pp. Maps, ills., index. B. G. Teubner, Leipzig, 1911. 3 mks. 8 x 5½.

Professor Dahms tells the life story of the German seashore by means of geological and geographical observations. In a style adapted to students in their teens he tells how waves do their work, now aiding in the formation of land and again carrying it away, and how man defies the flood, wresting from its power one bit of territory after another. Very wisely he tells his readers that their own personal studies out of doors must supplement the descriptions in these pages.

GENERAL

Dans L'Atlantique. Sainte-Hélène aux xviie et xviiie siècles, l'Archipel de Tristan da Cunha, Côtes de l'Afrique Australe, les Voyages d'Auguste Broussonet au Maroc et aux Canaries. Par Henri Dehérain. viii and 243 pp. Maps. Hachette et Cie., Paris, 1912. Fr. 3.50. 7½ x 5.

The best feature of this book is the 86 pages devoted to the Island of Tristan da Cunha, the largest of the three volcanic islands in the South Atlantic, sometimes referred to as the Tristan da Cunha Archipelago. The author has col-

lated from the scattered literature relating to this island a good account of its geography, history, colonization, resources, the ways of life in the small settlement and the influence of the meager habitat and its isolation upon the inhabitants.

Origin and Antiquity of Man. By G. Frederick Wright. xx and 547 pp. Ills., index. Bibliotheca Sacra Co., Oberlin, O., 1912. $2. 8 x 5½.

In the author's lucid, closely argumentative style, and with the "whole field of evidence" available, the various problems are discussed and conclusions reached. As in his recent revision of the "Ice Age in North America," Professor Wright believes in a rather brief glacial and post-glacial time, and consequently uses a very moderate estimate for the total length of geologic time. This interpretation crowds early human development into so short a time that it can hardly be called development at all, just a leap under divine touch.

The author finds no trustworthy evidence that man as a "tool-user" occurred earlier than the Pleistocene. But of his occurrence during that period, widely scattered and well diversified, there seems to be no doubt; and with all our evidence of man in Europe, man in America seems even better authenticated. While reviewer and author disagree on interpretation in a number of points this may be sometimes simply a matter of opinion. Cultural development of the race and geographic relations of men, phases which modern research has done so much for, receive surprisingly small space. An appendix of thirty pages contains annotations and bibliography. G. D. HUBBARD.

Walter Reed and Yellow Fever. By Howard A. Kelly. New, revised edition. xix and 310 pp. Ills., index. Medical Standard Book Co., Baltimore, 1912(?) $1.50. 8 x 5½.

This book is to a large degree a memorial of the life and work of Walter Reed. To give a background on which to depict the work of Reed in controlling the epidemics of yellow fever, there is included in the book chapters on the history of yellow fever and insects and diseases. The field of Reed's work was to a large degree in Cuba, and his experiments in the investigation of causes and preventive measures are told in detail. R. M. BROWN.

Weather and Weather Instruments. 175 pp. Ills., index. Taylor Instrument Cos , Rochester, N. Y., 1908. $1. 7½ x 5½.

This book gives a desultory account, loosely put together, of various meteorological phenomena, with comments on and more or less complete explanations of numerous meteorological instruments. It is obvious that the purpose of the book is to promote the sale of the instruments described therein. There is no attempt at anything in the way of a text-book. We imagine that some persons would gain an interest in meteorology through a reading of the volume, but there are inaccuracies and misleading statements in such number that it would take us quite beyond the limits of a review if we tried to enumerate them. As we write these words, the accidental turning over of a few leaves of the book brings to our eye the following statement: "As heavy air is air that has been condensed by cold, a rise in the barometer indicates a cold wind." Further comment is unnecessary. R. DEC. WARD.

Kants Ansichten über Geschichte und Bau der Erde. Von Dr. Erich Adickes. viii and 207 pp. J. C. B. Mohr (Paul Siebeck). Tübingen, 1911. 4.60 mks. 9½ x 6½.

Dr. Adickes, professor of philosophy in the university of Tübingen, gives in this book an historical account of the views held by Immanuel Kant (1724-1804) in regard to the history and structure of the earth. The book is divided into five sections, dealing with the years from 1750 to 1790, during which period the great philosopher of Königsberg shaped his cosmogonic theory. Adickes analyzes the various scientific treatises in which Kant formulated the problems involved. They consist in the main of two papers of the year 1754. First:

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Whether the earth has undergone a change in her revolution around her axis. Second: Whether the earth is growing older. In his great work: "Allgemeine Naturgeschichte und Theorie des Himmels oder Versuch von der Verfassung und dem mechanischen ursprung des ganzen Weltgebaudes, nach Newton'-schen Grundsätzen abgehandelt" (1755), (a general natural history and theory of the heavens, or an essay on the constitution and mechanical origin of the universe) and finally in three papers on the causes and history of the recent earthquakes, the views of Kant in regard to his cosmogonic theory are more elaborately explained. Kant explained the Lisbon earthquake (1755), as the result of electric forces in the earth's interior. He said of deserts: "All sand deserts are high plains and all high plains are deserts." The interior of the earth is, according to Kant, "still liquid or rather a chaotic mixture of liquid and solid masses." He believed the Biblical deluge embraced only the inundation of a certain territory and had nothing to do with a world-wide flood. Kant stood entirely on the shoulders of his contemporaries, whose views the philosopher tried to bring into harmony with his own. Adickes's book is a valuable contribution to the history of the development of geography, and philosophy.

CHARLES L. HENNING.

Great Religions of the World. By Herbert A. Giles; T. W. Rhys Davids; Oskar Mann; Sir A. C. Lyall; D. Menant; Sir Lepel Griffin: Frederic Harrison; E. Denison Ross; The Rev. M. Gaster; The Rev. Washington Gladden; Cardinal Gibbons. iii and 301 pp. Harper & Brothers, New York, 1912. $2. 8½ x 5½.

In putting to press for a second edition after twelve years this most catholic conspectus of the eleven faiths which now hold the greatest sway over the minds of men the principal modification lies in the addition to the essays by leading authorities of a series of brief synopses or introductions. These essays, each by the person best fitted to address our audiences upon his theme, are essentially popular and introductory; therein they serve a most important end and for those who seek to prosecute the inquiry further such a general survey will be found of value.

WILLIAM CHURCHILL.

Science of the Sea. An elementary handbook of Practical Oceanography for Travellers, Sailors and Yachtsmen. Prepared by the Challenger Society. Edited by G. Herbert Fowler. xvii and 452 pp. Charts, ills., index. E. P. Dutton & Co., New York, 1912.

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CHARLES L. HENNING.

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NEW MAPS

EDITED BY THE ASSISTANT EDITOR

For system of listing maps see p. 75 of this volume

MAPS ISSUED BY UNITED STATES GOVERNMENT BUREAUS

U. S. COAST AND GEODETIC SURVEY

Atlantic Coast

Bailey Cut to Burnt Fort, Satilla River, Georgia. [1:20,000]. In three sections: Section I [31°0′ - 30°57′ N.; 81°45′ - 81°32′ W.]. Section II [30°59′ - 30°56′ N.; 81°49′ - 81°45′ W.]. Section III [30°57′ - 30°54′ N.; 81°56′ - 81°48′ W.]. 1 color. Chart No. 450. April, 1912. 50 cts.

[Channel line shown in red.]

U. S. GEOLOGICAL SURVEY

Topographic Sheets

(*Including Combined and Special Topographic Maps*)

Arizona. Petrified Forest Quadrangle. Surveyed in 1910. 1:62,500. 35°0′ - 34°45′ N.; 110°0′ - 109°45′ W. Contour interval 25 ft. Edition of Oct. 1912.

[See notice in *Bull.*, Vol. 45, No. 1, 1913, p. 46.]

California. Prairie Creek Quad. Surveyed in 1909-1910. 1:31,680. 39°22′30″ - 39°15′0″ N.; 121°30′0″ - 121°22′30″ W. With inset: 39°25′0″ - 39°22′30″ N.; 121°30′0″ - 121°26′50″ W. Interval 5 ft. (Preliminary) edit. of Sept. 1912.

[One of the two-inches-to-the-mile sheets of the Sacramento Valley. The eastern half of the main map is blank.]

Michigan. Lansing Quad. Surveyed in 1909 and 1910. 1:62,500. 42°45′ - 42°30′ N.; 84°45′ - 84°30′ W. Interval 20 ft. Edit. of Aug. 1912.

Minnesota. (a) Chokio Quad. Surveyed in 1910. 1:62,500. 45°45′ - 45°30′ N.; 96°15′ - 96°0′ W. Interval 10 ft. Edit. of Oct. 1912.

(b) Morris Quad. Surveyed in 1910. 1:62,500. 45°45′ - 45°30′ N.; 96°0′ - 95°45′ W. Interval 10 ft. Edit. of Dec. 1912.

(c) Wendell Quad. Surveyed in 1910. 1:62,500. 46°15′ - 46°0′ N.; 96°15′ - 96°0′ W. Interval 10 ft. Edit. of Jan. 1913.

[Elevations on sheets (b) and (c) 1.4 ft. too high.]

Missouri. Aurora Quad. [*sic*]. Surveyed in 1909-1910. 1:62,500. 37°8.4′ - 36°55.0′ N.; 94°15.7′ - 93°36.2′ W. Interval 10 ft. Edit. of Nov. 1912.

[A special map including portions of the southern parts of Carthage and Greenfield sheets, already published. Area south of 37°0′ is new.]

Utah-Wyoming. Randolph Quad. Surveyed in 1909-1910. 1:125,000. 42°0′ - 41°30′ N.; 111°30′ - 111°0′ W. Interval 100 ft. Edit. of Oct. 1912.

West Virginia. Iaeger Quad. Surveyed in 1910. 1:62,500. 37°30′ - 37°15′ N.; 82°0′ - 81°45′ W. Interval 50 ft. (Preliminary) edit. of Aug. 1912.

[Embraces the area of the northwest quarter of the Tazewell sheet, on double the scale and with half the contour interval, however. The Virginia portion of the sheet is blank.]

West Virginia-Maryland-Pennsylvania. Williamsport Quad. Surveyed in 1910. 1:62,500. 39°45′ - 39°30′ N.; 78°0′ - 77°45′ W. Interval 20 ft. Edit. of Oct. 1912.

[On same sheet, names of townships engraved (Penna. portion) and printed from type (Md. and W. Va. portion).]

[The fortunate increase in the use of green to designate woods on the topographic sheets of the U. S. Geological Survey is exemplified by this set of new

maps, seven of which, out of a total of ten, bear this symbol. The color used varies still, however, from the effective and perfectly transparent bright green on the Morris, Minn., sheet to the dull olive or pale green, respectively, on the Chokio and Wendell, Minn., sheets and the Iaeger, W. Va., sheet. On such sheets, furthermore, and especially on the latter sheet, because of the rugged topography represented, the boundaries of the wooded areas cannot always be made out clearly: the use of a faint bounding line in black would obviate this difficulty.]

NORTH AMERICA

CANADA

BRITISH COLUMBIA, ETC. Map of the Province of British Columbia. 35 miles=1 inch [1:2,217,600]. 63° - 48° N.; 141° - 114° W. 4 colors. Dept. of Lands, Victoria (B. C.), 1912.

[Reproduction of the relevant part of the standard base map of Canada on the same scale published by the Dept. of the Interior, Ottawa. Lands reserved from sale or lease colored pink.]

CENTRAL AMERICA AND WEST INDIES

PORTO RICO. Map of Porto Rico. 1:500,000. 19° - 17° N.; 68° - 65° W. 3 colors. Topogr. (now Geogr.) Section, General Staff, [Publ.] No. 2032, London, May 1905.

[Good general map. Drainage in blue, relief in brown shading.]

AFRICA

ABYSSINIA, ETC. Abyssinia. (Provisional Issue). 1:3,000,000. 16° - 2° N.; 31° - 47° E. 17 colors. Topogr. (now Geogr.) Section, General Staff [Publ.] No. 2319, London, 1908. Price 2/6.

[Excellent hypsometrical map showing relief in ten colors, ranging from green to brown, with contours at 0, 500, and 1,000 ft. and thence for every 2,000 ft. The Rift Valley bordering the Abyssinian Highlands on the east is thus well brought out. Of the depressions below sea level near the junction of the Rift Valley with the Red Sea that of Lake Alel Bad, to the southeast of Massawa, is given with its depth below sea level (200 ft.), while that of Lake Assal in French Somaliland, which is nearly three times as deep (570 ft.), although shown, bears no indication of its depth. Caravan and main routes are shown in red.]

CENTRAL AND NORTHEASTERN AFRICA. Carte des Chemins de Fer du Soudan Égyptien et de l'Afrique Orientale. 1:30,000,000. 33° N. - 7° S.; 10° - 45° E. Accompanies, as Fig. 12 on p. 119, "Relations entre le haut Oubangui et la vallée du Nil" by C. Pierre, *La Géogr.*, Vol. 26, No. 2, 1912, pp. 114-124.

[In addition to railroads the map shows M. Charles Pierre's routes in 1898, 1904 and 1911-12 from the mouth of the Congo to the mouth of the Nile.]

FRENCH EQUATORIAL AFRICA, ETC. Essai de Carte des Isogones du 1er Janvier 1908 en Afrique Équatoriale Française. 1:10,000,000. 18° N. - 8° S.; 8⅓° - 27⅓° E. Accompanies, as Fig. 20 on pp. 232-233, "Déclinaisons observées en Afrique équatoriale française et essai de carte des isogones au 1er janvier 1908" by G. Bruel, *La Géogr.*, Vol. 26, No. 4, 1912, pp. 229-240.

FRENCH EQUATORIAL AFRICA-BELGIAN CONGO. Projet d'un chemin de fer de Brazzaville à l'Océan (Afrique Equatoriale française). Mission J. Mornet, Avril 1910-Février 1912. 1:2,500,000. 3½° - 6⅕° S.; 11° - 15⅔° E. With profile of railroad and inset: [Africa showing] Bassin Navigable du Congo aboutissant au Stanley Pool. Accompanies, as Fig. 25 on p. 307, "Mission d'étude du chemin de fer de l'Océan à Brazzaville (Avril 1910-Février 1912)" by J. Mornet, *La Géogr.*, Vol. 26, No. 5, 1912, pp. 297-318.

[Map based on this one will be published, with comment, in a forthcoming number of the *Bull.*]

ITALIAN SOMALILAND. Carta Magnetica del Benadir per l'epocha 1909.0. 1:4,000,000. 6° N. - 1⅔° S.; 42° - 49° E. 1 color. Accompanies, after p. 12,

"La Carta Magnetica del Benadir" by L. Palazzo, *Monogr. e Rapp. Colon, N. 17*, Ufficio di Studi Coloniali, Ministerio degli Affari Esteri, Rome, Sept. 1912. [Shows isogonic and isoclinic lines and lines of equal horizontal intensity.]

PORTUGUESE WEST AFRICA-BELGIAN CONGO. (a) Itinéraire de Jan de Herder d'après Dapper et d'Anville. Approximately same scale and limiting coordinates as map (b), below.

(b) Itinéraire de Jan de Herder, restitué d'après les cartes modernes. [1:4,400,000]. 4½° - 9° S.; 12° - 17° E.

Accompany, as Figs. 28 and 29 on pp. 320 and 321, respectively, "Une exploration oubliée: Voyage de Jan de Herder au Kwango (1642)" by R. Avelot, *La Géogr.*, Vol. 26, No. 5, 1912, pp. 319-328.

[Route of a Dutch traveler of the seventeenth century, of more than usual competence for his time, from São Paulo de Loanda into the interior as far as the lower course of the Kwango, a left tributary of the Congo. On map (a) distances have been reduced two-fifths to reconcile them with the other measurements of the original map, while on map (b) the route is reconstructed on the basis of a modern map.]

WEST AFRICA (SUDAN AND UPPER GUINEA). Carte Botanique, Forestière et Pastorale de l'Afrique Occidentale Française. Dressée sous la direction de A. Chevalier. 1:3,000,000. 21¼° - 4° N.; 18° W. - 7⅔° E. 6 colors. Accompanies, as Pl. I, note with same title by Baron Hulot, *La Géogr.*, Vol. 26, No. 4, 1912, pp. 276-277.

[Highly important map showing in detail the vegetational formations, not alone of French West Africa, as the title implies, but of the whole of the Sudan and Upper Guinea. The formations distinguished are: (1) equatorial forest; (2) gallery forest of Upper Guinea; (3) gallery forest of the Sudan; (4) low plains of Upper Guinea, usually without gallery forest; (5) savanna of Upper Guinea and the Sudan; (6) savanna of the low plains of Upper Guinea; (7) savanna of the region lying between the equatorial forest and the coast; (8) savanna of the zone transitional to the Sahara (with spiny shrubs); (9) desert; (10) sub-alpine formations; (11) reed marshes; (12) mangrove swamps; (13) regions partially inundated at high water and dry during the rest of the year. In addition, 13 symbols are used to denote plant products, and three kinds of pastures are distinguished. The author's route is shown in red. Escarpments and mountain massifs are shown. The map is a model of its kind. The general phytogeographic relations of the area represented to the whole of Africa may be seen by referring to the excellent Wandkarte von Afrika zur Darstellung der Bodenbedeckung, bearbeitet von Paul Langhans, 1:7,500,000, Justus Perthes, Gotha.]

ASIA

ASIA MINOR. Richard Kiepert: Karte von Kleinasien. 1:400,000. [Sheet] B-V: Sivas. Zweite berichtigte Ausgabe. 1912. 40°38′ - 38°54′ N.; 36°38′ - 39°30′ E. 3 colors. Oriented N. 2½° W. Dietrich Reimer (Ernst Vohsen), Berlin. Price M. 6.

[A new edition of one of the sheets of this standard topographic map of Asia Minor. The principal differences from the first edition of 1902 are in the western part of the sheet. The use of green to show river flood plains is an innovation. Relief is shown, as usual, in brown shading. For previous comment on this map, see under "Asia Minor" *Bull.*, Vol. 38, 1906, p. 320, Vol. 39, 1907, p. 565, and Vol. 40, 1908, pp. 111-112 and 363.]

ASIA MINOR. Topographische Karte des westlichen Kleinasiens nach eigenen Aufnahmen . . . entworfen von Dr. Alfred Philippson. 1:300,000. Blatt 2. 40°32′ - 38°59′ N.; 28°10′ - 30°30′ E. 7 colors. Blatt 4. 39°0′ - 37°27′ N.; 28°10′ - 30°26′ E. 4 colors. Justus Perthes, Gotha, 1912. Price of the two sheets together M. 8.

[Detailed comment on this excellent map and its significance will be found in the *Bull.*, Vol. 43, 1911, pp. 548-549, where its full title is also given. The two sheets listed above adjoin the previous two on the east.]

CHINA. Itinéraires de la Mission Legendre au Kien Tch'ang et dans les Marches Tibétaines. 1:1,000,000. 30°11′ - 26°38′ N.; 100°55′ - 103°10′ E. With inset, [1:30,000,000], showing location of main map. Pl. 2, "Récente ex-

ploration du Dr. Legendre" by A. Legendre, *La Géogr.*, Vol. 24, No. 6, 1911, pp. 345-354.

[Important original surveys in western Sze-chuan embodying, for the first time, a correct representation of the Ya Long, one of the main sources of the Yangtsekiang, between 30° and 28° N., and of the Ngan Ning, a tributary of the Ya Long, from its source near 29° N. south almost to 27° N. For the survey of the Ya Long south of 28° N. by Capt. Audemard see under "China" (first entry), *Bull.*, Vol. 44, 1912, p. 79.]

CHINA. Itinéraires de la Mission Legendre dans l'Ouest Chinois, 1910-1911. 1:3,500,000. 30°23′ - 25°20′ N.; 100°10′ - 104°45′ E. With inset, [1:55,000,000], showing location of main map. Accompanies, on p. 369, "Exploration dans la Chine occidentale et les marches tibétaines" by A. F. Legendre, *La Géogr.*, Vol. 26, No. 6, 1912, pp. 365-375.

[Shows with what a dense network of routes this important expedition covered the mountainous highlands of Sze-chuan between 26° and 30° N. Legendre's earlier routes (1903-1909) are also shown. See immediately preceding entry.]

FRENCH INDO-CHINA. (a) Les zones d'irrigation dans le delta du Tonkin. 1:1,600,000. [21°44′ - 19°56′ N.; 105°7′ - 107°10′ E.]

(b) Croquis schématique des irrigations derivées du Song-cau. [1:500,000 approx.] (Region to the north of Hanoi.)

Accompany, as Figs. 16 and 17 on pp. 191 and 195, respectively, "L'irrigation dans le delta du Tonkin: Ses conditions géographiques" by E. Chassigneux, *La Géogr.*, Vol. 26, No. 3, 1912, pp. 177-202.

AUSTRALASIA AND OCEANIA

QUEENSLAND. Croquis de la Vallée Supérieure de la Flinders, par M. le Dr. J. V. Daneš. 1:500,000 approx. [20°35′ - 21°0′ S.; 144°10′ - 144°45′ E.] Accompanies, as Fig. 23 on p. 265, "La capture de la haute Flinders" by J. V. Daneš, *La Géogr.*, Vol. 26, No. 4, 1912, pp. 263-269.

[For a map illustrating a similar paper on the physiography of Queensland by Dr. Daneš see, under "Queensland," *Bull.*, Vol. 45, No. 2, 1913, p. 159.]

EUROPE

GERMANY. Karte der Deutschen Wasserstrassen unter besonderer Berücksichtigung der Tiefen- und Schleusen-Verhältnisse von Sympher und Maschke. 4. wesentlich veränderte Auflage. Im Auftrage des Herrn Ministers der öffentlichen Arbeiten nach amtlichen Unterlagen bearbeitet von Dr. Ing. Sympher, Geheimer Ober Baurat. 1:800,000. 56° - 47° N.; 2° - 24° E. 11 colors. With five insets: (1) Die Wasserstrassen bei Strassburg. 1:50,000. 8 colors. (2) Schleusen bei Emden. 1:200,000. 8 colors. (3) Die Wasserstrassen in Gross-Berlin. 1:100,000. 10 colors. (4) Die Wasserstrassen im rheinisch-westfälischen Industriebezirk. 1:300,000. 10 colors. (5) Die Wasserstrassen des Weichseldeltas. 1:400,000. 7 colors. In four sheets. Gea Verlag, Berlin (1912).

[Large-scale map showing by means of bands of different color and width the navigability of German waterways. Navigable rivers are shown in blue, canalized rivers in green, navigable canals in yellow and works under construction in pink. Depth is indicated by the width of the color band, distinction being made between high and low water. Locks are shown drawn uniformly to the scale of 1:3,000. In addition, the distances are given of all places from the mouth of the waterway on which they lie, and railroads are shown.]

BALKAN PENINSULA, ETC. Ethnographische Übersicht des Europäischen Orients zusammengestellt von H. Kiepert, Berlin, im Mai 1876. (Die politischen Grenzen berichtigt 1912). [1:3,000,000]. 48⅔° - 34⅘° N.; 13¾° - 31° E. 10 colors. Dietrich Reimer (Ernst Vohsen), Berlin. Price M. 2.

[Although printed from an old plate and compiled in 1876 this map, because of its relatively large scale and the competence of its compiler, is one of the most valuable representations of the distribution of races in southeastern

Europe. It distinguishes between (1) remnants of the autochthonous population and (2) peoples having occupied this territory since the Middle Ages. To the first category belong the Greeks, the Illyrians (Albanians) and the Rumanians. To the second category belong the Servians, Croatians, Slovenes and Bulgarians, representing the southern Slavs, the Slovaks, representing the western Slavs, and the Russians (included in the N. E. corner of the map), representing the eastern Slavs; furthermore the Germans, the Magyars and the Turks. The map does not correspond to present conditions in some minor respects. Thus, the preponderance of the Bulgarian element in Turkish territory east of the Tunja and Maritza Rivers is not sufficiently emphasized, nor is cognizance taken of the Albanian enclaves on the southern side of the Gulf of Patras, of those in the province of Triphylia near the western coast of the Peloponnesus nor of those at the root of the peninsula enclosing the Gulf of Laconia on the east. In view of the frequently greater importance of the religious than the racial factor in southeastern Europe, the value of the map would have been enhanced if the distribution of the Mohammedan population had been shown. This element will be found represented on the excellent ethnographic map of Europe, 1:12,000,000, in Debes's Handatlas (Pl. 12c).]

BALKAN PENINSULA. Makedonien, Altserbien und Albanien. IV. Auflage, 1912. 1:864,000. 43°40′ - 39°30′ N.; 18°20′ - 24°50′ E. 7 colors. With inset: Die sprachlichen Interessensphären in und um Makedonien u. Altserbien. Gezeichnet von Dr. Karl Peucker. 1:8,000,000. 46° - 39⅓° N.; 18° - 30° E. 6 colors. Artaria & Co., Vienna.

[Chief value of main map lies in its relatively large scale. Relief in shading in brown. Boundaries of Turkish *vilayets* and *sanjaks* shown. The inset deserves special attention as it solves the problem of representing districts with a heterogeneous racial population. It does this by means of lines of different color which indicate the outer limit of the territories occupied by each nationality. This method allows of the superimposition of racial symbols required by the complexity of conditions in the Balkan, without impairing their legibility, however. Thus it is visible at a glance that the region immediately to the west of the Maritza below Adrianople is inhabited by Greeks, Bulgarians, and Turks, while a region to the southwest of Üsküb harbors simultaneously Bulgarians, Servians and Albanians. The value of the inset map is further enhanced by the representation of the non-Turkish Mohammedan element. The whole map is accompanied by suggestive statistical tables and summaries of the history of the Balkan peoples.]

WORLD AND LARGER PARTS

WORLD. Principal Transportation Routes of the World. [Mercator's Projection: equatorial scale 1:37,500,000]. 73° N. - 60° S.; 100° E. (W. border) - 170° W. (E. border). 2 colors. Bureau of Statistics, Dept. of Commerce and Labor, Washington, 1909.

[Practically all steamship routes of any importance are shown; distances between ports in nautical miles. Principal railroad lines of the world shown somewhat diagramatically. Valuable tables are appended giving (1) distances from New York, New Orleans, San Francisco and Port Townsend to the principal ports of the world and the principal cities of the United States; (2) number and tonnage of steamers and of sailing vessels of all nationalities for 1908-09; (3) foreign tonnage movement at the principal ports of the world, 1908; (4) mileage of railroads of the principal countries of the world; (5) miles of railroads in the United States, 1832-1907. From the first table, for instance, the comparative distances in nautical miles from New York via Panama or Suez to the following ports are visible at a glance (distance via Suez in parentheses): Yokohama, 10,093 (13,041); Shanghai, 10,855 (12,360); Hongkong, 11,431 (11,610); Manila, 11,546 (11,556); Melbourne, 10,028 (12,981).]

Erratum

In "New Maps" in the January *Bulletin* (Vol. 45, No. 1, 1913) the source of the two maps listed under "Italy" on p. 79 was omitted. It should have read: Taf. 43 and 44, "Karten des Eruptionskegels des Vesuv und des Vesuvkraters" by I. Friedlaender, *Pet. Mitt.*, Vol. 58, II, Nov., 1912, pp. 274-275.

XIIM